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A National Newspaper for Every Branch of the Industry

Automotive Daily News

CARS · SHOP EQUIPMENT · TRUCKS · AVIATION · PARTS · ACCESSORIES · TIRES

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JUN 5 1930
DETROIT

S. A. E. DISCUSSES DIESEL ADAPTABILITY

New Truck Registrations In April Keep to High Level; Five States Gain

Aggregate Sales in First 28 States to Report and D. C. Show Decline of 16% from Year Ago

NEW YORK, May 28.—After the remarkable high level to which new truck registrations held in the United States in the first quarter it was to be expected that there would be a decline in April, but, on the basis of the returns from twenty-eight states and the District of Columbia, the falling off will not be great.

New commercial sales in January broke all records for that month in the history of the industry and February and March followed with only slight losses. The net result was a loss of only 4 per cent. in the first three months from the record breaking levels of the first quarter of last year.

In the first twenty-eight states and the District of Columbia reporting April truck registrations, the total retail sales were 27,535, as compared with 32,807 in the corresponding states in April, 1929, a decline of 5,272 units, or only 16 per cent. This compares with a loss of 26 per cent. by the passenger cars.

Aggregate sales of both the Ford and Chevrolet commercial cars showed declines in these states, as compared with a year ago, after having recorded substantial gains in the earlier months.

Ford registrations in the states thus far heard from amounted to 13,110, as compared with 13,619 a year ago, while Chevrolet sales this year were 7,822, as compared with 10,065 in the same states a year ago.

Ford percentage of the whole this year in these states was 47., as against 41 per cent. in April, 1929, while Chevrolet's share this year amounted to 28 per cent., as against 30 per cent. a year ago.

Brockway-Indiana, Stewart and Willys-Knight trucks registered more heavily in the reporting states in April, 1930, than in 1929, in con-

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PHELPS, INC., TAKING OVER ADVERTISING ACTIVITIES OF REO

Detroit, May 28—George Harrison Phelps, Inc., well known advertising counsel of Detroit, is establishing offices in Lansing preparatory to taking on general advertising activities of Reo Motor Car Company.

Although this change is not fully effective until August 1, the Phelps organization has already leased office space in the Prudden Building in Lansing and on June 1 will open a complete branch there to serve Reo and other accounts in that section of the state. The new branch will operate under the supervision of H. J. Koch, vice-president of George Harrison Phelps, Inc. Among those assisting him will be Oscar F. Jackson, until recently advertising manager of Reo, who joins the Phelps staff June 1; George D. Wilcox, who resigned a few weeks ago as sales promotion manager of Federal Motor Truck Company to join the Phelps organization, and Capt. R. A. Leavell, technical expert of Phelps agency.

Mr. Jackson will devote himself principally to assisting in Reo contact work and in the publication of

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LAMONT LAUDS SAFETY OF PRESENT DAY CAR; CRITICIZES OWNERS

Washington, May 28.—Automotive manufacturers have achieved remarkable results in the development of safe vehicles, but private owners have not done so well in maintaining their cars in safe condition, Secretary of Commerce Lamont declared yesterday in an address opening the annual meeting of the National Conference on Street and Highway Safety.

His speech was a comprehensive analysis of the work of the conference in the last year, with figures showing gains and losses in traffic fatalities.

Secretary Lamont said that in 1920 for every 100,000 automobiles in use, motor accidents caused 136 deaths. By 1925 this ratio had been brought down to 110 and in 1926 to 127 deaths per 100,000 motor vehicles, he pointed out. However, since 1928 the ratio has reversed its trend, he asserted, and has constantly mounted, reaching 117 fatalities per 100,000 cars last year.

"States which have centralized state motor vehicle administration, including drivers' license systems with mandatory examination," Secretary Lamont said, "have shown a smaller rate of fatality increase than has occurred in the other group of states."

OLDS MOTOR PROMOTES SCHILLER, CAR RACER

Lansing, Mich., May 28.—The appointment of J. W. Schiller as technical supervisor of the parts and service department of Olds Motor Works is announced by C. R. Todd, general service manager. Mr. Schiller succeeds Grant B. Sturgis, who has been transferred to the central office of General Motors for special service activities.

J. W. Schiller

Mr. Schiller has been actively engaged in the automobile industry for thirty years and has been with Olds Motor Works for twenty years. He has been a member of teams competing in the Vanderbilt Cup Race and the first race held at Indianapolis. For the past twenty years he has made a final test drive to the Pacific Coast and return of every new model introduced by Olds Motor Works.

Mr. Schiller entered the automobile industry in 1900 as a member of the tool department of the Locomobile Company in Bridgeport, Conn. Six years later he engaged with the Pope-Waverly Company in Indianapolis and a year later went with Norndyke & Marmon, the predecessor of the present Marmon company.

ELECTRIC BRAKE FUNCTIONS, BALLOON TIRED TRUCK AXLE DESIGN FEATURE DEBATES

Use of Cheap Fuel in Operation of Small Diesel Discouraged; Cummins, Hill Demonstrate Broad Advances Made

By A. LUDLOW CLAYDEN

FRENCH LICK, Ind., May 28.—Technically the outstanding event at yesterday's session of the summer meeting of the Society of Automotive Engineers was the reading of papers on Diesel engines by C. L. Cummins and H. D. Hill. But arrangements committee evidently made a wrong guess and designated them to the smaller hall with the result that the meeting was crowded beyond seating capacity.

L. R. Buckendale of the Timken Detroit Axle Company read his paper, "The Application of Balloon Tire Equipment on Motor Coaches and Trucks," to a gathering in the larger hall.

Mr. Cummins, who is connected with the Cummins Diesel Engine Company, and Mr. Hill of the Hill Diesel Engine Company described in detail two different types of automotive size Diesels. Cummins showed motion pictures of his Diesel Roadster doing eighty miles an hour over Daytona Beach, Fla., and later in the day demonstrated it, showing a flexibility similar to that of the gasoline autos of thirty years ago, with much better speed and hill climbing ability.

It is to be realized, after viewing a demonstration of the sort witnessed yesterday, that the problem of the flexible small Diesel is that of controlling the metering of a very small charge of fuel and then injecting it with complete accuracy, just as the old-time automobile problem was to get a really automatic carburetor with a wide enough range.

Cummins and Hill have both advanced a good way along this road. Neither made claim of having finished their development work nor predicted any immediate and gen-

(Continued on Page 2)

WEIGHTS AND MEASURES CONFERENCE TO OPEN JUNE 3 IN WASHINGTON

Washington, May 28.—Filling station grease-measuring devices, testing of vehicle tank meter and odometers used for recording mileage on drive-yourself cars will be given considerable attention at the twenty-third annual Conference to Weights and Measures to be held here June 3 to 6, it was announced today by Dr. George K. Burgess, director of the Bureau of Standards.

Paul E. Hadlick of the American Petroleum Institute will speak on grease-measuring devices such as are used to dispense heavy lubricants used in automobile differentials and transmissions. Notes on the same subject covering a recent survey will be presented by Ralph W. Smith of the Bureau of Standards.

Other papers covering the testing of vehicle tank meters will be presented by Francis Meredith, director of the division of standards of Massachusetts; S. T. Griffith, chief of the division of weights and measures of Baltimore, and H. N. Davis.

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Diesel-Electric Bus Arrives at French Lick

Newark, N. J., May 28.—A Public Service electric drive bus, equipped with a Diesel engine, using fuel oil instead of gasoline, has just completed a satisfactory trip from Newark to French Lick, Ind., a distance of 900 miles, in four days, according to word received here today. The route chosen necessitated the crossing of the mountains of Pennsylvania.

The bus left the Public Service terminal, Newark, Wednesday evening, May 21, and arrived at French Lick Sunday evening, May 25. Albert A. Lyman, automotive engineer Coordinated Transport, was in charge, and Charles Doty, operator-mechanic.

This Diesel-electric bus, representing one of the latest developments in the automotive field, is now on exhibition at the silver anniversary meeting of the Society of Automotive Engineers, in session at French Lick. It is claimed that this is the only Diesel-electric bus in the world.

MARMON ADDS NEW CONVERTIBLE SEDAN TO BIG EIGHT LINE

Indianapolis, May 28.—The addition to the Marmon Big Eight line of a five-passenger sportsman's convertible sedan, known as the Marmon Grand National, is announced by Thomas E. Jarrard, general sales director.

The new body style is a replica of a specially designed car for Mahmoud Sabit Bey of Cairo, Egypt, which created such a favorable impression that it was placed in production. The body is by Locke on a standard Big Eight chassis, and the price is $3,895 at the factory, with wire wheel equipment available at additional cost.

A single door on each side of the car is approximately forty inches wide, making easy entrance for both front seat and back seat passengers. The driver's seat, which is adjustable, is an individual unit separate from the other front seat.

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Midwest Car Sales Gain In April Over March

Chicago, May 28.—Sales of new cars in Seventh Federal Reserve District at wholesale and retail, as well as those of used cars, continued to gain in April, although the expansion over March was not so large as between February and March.

The increase in value of cars sold at retail was considerably greater than the increase in their number, owing to heavy sales of a high-priced car.

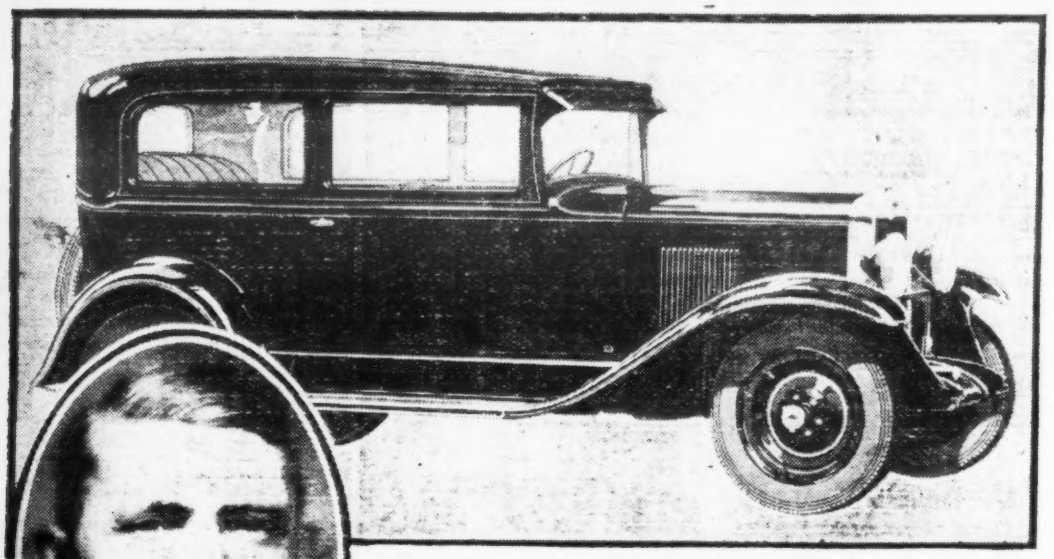
Wholesale distribution in April again showed a loss from a year ago, while the decline in retail sales in the year-to-year comparison was noticeably smaller than in March. Stocks of both new and used cars continued to decline, and those of the former averaged smaller than a year ago.

Following table shows percentage changes in sales and cars on hand reported by twenty-nine wholesalers and fifty-nine retailers:—

	% Change from Apr., 1929.	% Change from Mar., 1930.
Number new cars sold wholesale	—49.7	+18.3
Value new cars sold wholesale	—45.4	+20.9
Number new cars sold retail	—19.3	+17.9
Value new cars sold retail	—23.7	+35.4
Number new cars on hand April 30	—20.5	—20.3
Value new cars on hand April 30	—29.2	—21.5
Number used cars sold	—11.4	+ 8.1
Number salable used cars on hand	+ 5.8	— 5.1
Value salable used cars on hand	— 6.9	— 1.3

Deferred payment sales constituted 52 per cent. of the total retail sales of thirty dealers in April, which compared with 55½ per cent. in the preceding month and is the same as in April, 1929.

Chevrolet Builds 7,000,000th Car



THE SEVEN MILLIONTH automobile produced by the Chevrolet Motor Company rolled off the assembly lines in the company's Flint, Mich., plant yesterday. The epochal car, which happens to be a coach, was driven into the plant yard by W. S. Knudsen, president and general manager, shown in inset

WEIGHTS AND MEASURES CONFERENCE TO OPEN JUNE 3 IN WASHINGTON

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deputy state commissioner of weights and measures of Vermont. Another matter of popular interest to be considered is the performance requirements of odometers, which are also used on flat-rate taxicabs operating outside their regular zone.

A novel feature of the conference this year will be an exhibition of liquid measuring devices of the new type now being used to meter gasoline, in which a valve is used at the nozzle, any amount of fluid being delivered at one time.

Seven manufacturers of these meters will exhibit their products and explain how they operate.

PACKARD CUTS PRICES ON STANDARD EIGHTS

Detroit, May 28.—A reduction of $400 on all eleven models of Packard Motor Car Company standard eight line is made effective immediately.

Reduction is preparatory to the introduction of a new car in the fall. The new line will show even less change in the exterior appearance than was noticeable last fall when the present line of standard eights was introduced. Changes are to be improvements and refinements. New cars will be equipped with the Packard straight eight motor.

New list prices of popular models follow: Five-passenger sedan, $2,085; roadster, $2,025; phaeton, $2,025; coupe, $2,125; club sedan, $2,275, and seven-passenger sedan, $2,385.

AUTOMOBILE SALES EXECUTIVE

Your organization may need a leader to lend punch and pep to your sales department and increase your business. This advertiser has the ability to do just this. An outstanding fourteen-year record in organizing and building successful sales forces, both retail and wholesale territorial work in the Greater N. Y. territory. Served as vice-president and general sales manager for one of the leading corporations in the East. The company I associate with must be sound and willing to co-operate to the full extent. Address

Box 260,
Automotive Daily News,
2716 Graybar Building,
New York City

Diesel's Ready Adaptability Shown at S. A. E. Conference

(Continued from Page 1)

4s, Colorado & Southern 4½s, the eral use of Diesels for trucks or cars. but their conservative estimates went far to confirm the general idea that Diesels are ready for usage at least by heavy vehicles.

Both the power plants look like regular automotive jobs; in fact, just a glance under the hood would hardly be enough to show that they are Diesels. They are clean cut engineering jobs, run with clean, though somewhat odoriferous exhausts, start electrically and handle from the driver's viewpoint very much like a gasoline engine.

The discussion of the papers consisted almost wholly of questions upon details of design and performance, as comparatively few men have any personal experience with this type of engine. Attention was called to the nearly always neglected fact that small Diesels will not run on fuels cheaper than gasoline, although due to better efficiency they may use less.

If the demand was for Diesel fuel and it had to be available at fueling stations the price would be higher than that of gasoline because there is much less of this to be had from the oil industry. This was emphatically pointed out by Henry M. Crane lately. Cheap fuel for light Diesels can be bought now in tank car quantities, but so can cheap gasoline, and there is a tendency to compare refinery Diesel fuel prices with street gasoline prices, which is, of course, absurd. The Diesel engine is good enough with its high potential efficiency, its mechanical simplicity and its durability to stand alone without the false supposition that it can be expected to operate on road tar.

Automobile engineering is an exact science now in a lot of respects, just like bridge building or railroad construction. A good many S. A. E. papers in the last few years have been chapters of a text book of automobile engineering construction. Of quite a different character was John Whyte's paper on the Warner Electric Brake, although the discussion showed that Whyte knew his groceries when it came down from the electrical control to the mechanics of the brake itself.

The Warner brake is an expanding, self-wrapping band brake, one end of the band fixed and the expansion caused by pressure on the other end. Inside the brake is a ring consisting of a series of pole pieces, with windings all embedded in bakelite and the pole pieces just very lightly touch the disk part of the brake drum. The armature is held from revolving by a spring. As soon as a very small current is turned into the coils, actually about three amperes, the pole pieces become magnets and stick to the brake drum, whereupon the armature starts to turn with the drum. As soon as this happens it is brought up against the free end of the brake band and starts to expand the latter.

A model shown demonstrated that delicately graded application was secured through the control pedal which sends very little current for a light pressure and the maximum of three amperes with full movement of the foot. An attractive feature of the brake is that there are no adjustments, and the four brakes can all have different clearances.

Equalization of pressure among the four brakes is naturally perfect because the same current goes to each. Whyte was asked innumerable questions, showing that the interest was keen, and the writer predicts that there will soon be a number of experimental cars running around Detroit with Warner brake sets.

At the evening session Art Scaife of the White Company, who can figure truck ability in his sleep, contributed another highly useful addition to the altogether inadequate literature on the subject, and A. W. Frehse of the Chevrolet Motor Company turned in a fine piece of work on mathematical analysis of brake design, while L. R. Buckendale gave the axle makers an aspect of the balloon tire for trucks which seems destined to displace all others just as it has done in the passenger car field.

Buckendale's paper dealt with the increasing difficulty of providing satisfactory combinations of tires, brakes, frame widths, springs and stability within the overall limits of width now legal, usually ninety-six inches. He covered the development of the axle and the tire and showed how the low pressure tire with its unquestionable advantages and high desirability had, none the less, made axle design from the braking and steering viewpoints an almost unsolvable problem. He called for close co-operation from all interested parties and urged work upon the establishment of a vehicle code which could be worked by highway engineers, for without help from the road builders we have reached the limit of vehicle size. Art Scaife of White and B. B. Bachman of Autocar supported strongly. The former said that both for passenger vehicles and trucks it was time to consider very carefully how much bigger it could possibly pay to get. The law of diminishing returns, he said, puts limits of economic size on everything. The double deck bus with its large passenger capacity takes so much longer to load and unload and is thus standing still so much more of its time that in many cities the smaller single deckers pay better.

The problem, he said, is at last as much economic as it is engineering. Bachman stated "that whatever opinion might be about legal limits of size and whatever leeway legislatures might decide to give we still had the practical limits. Buses have to enter and leave loading places. They cannot always be operated on super-highways and the problem of the present day is to do the best we can with the roads we've got. Clearly there has seldom if ever been a situation in automotive history where it was so necessary that vehicle and tire makers, legislatures and users must get together and work out the answer or a great deal of money and effort will be thrown away and the ultimate development of large load buses and trucks perhaps seriously retarded."

Mr. Scaife as vice-president of this division of the society in introducing his paper said that, "the decision has been made to have one good paper, the one we have just listened to and then a short one dealing with a smaller and specialized subject."

He then read his own short but very informative address and showed a series of diagrams charting the ability in speed, load and hill climbing capacity of a number of different examples. With unsuitable gear ratios or shift gear spacings, he showed, that once the grade was too much for high gear the truck would get right down to its low speed in short order, second and third gears being very little use. With different choice of ratios there would be good overlap so that shifts could be made over a fair speed range and the machine might be expected to even gain a little speed after dropping from high to third or third to second.

In a paper read today, H. V. Middleworth of the Consolidated Gas Company took as his subject—"Self-Maintenance as Compared with Service Station Maintenance." He said:—

The conditions under which motor vehicles operate are so varied that it would be extremely difficult to arrive at any fixed or definite rule governing the method of maintaining motor vehicle fleets. Furthermore, it would be difficult to determine what the minimum number of vehicles should be to justify the establishment of a self-maintenance organization.

We speak or large operators and small operators, but just where to draw the line between the two is without doubt a difficult problem. Suppose we call a large operator one who operates forty vehicles or more and a small operator one who operates less than forty vehicles. It is obvious that the large operator, with equipment separated into small fleets in remote localities would bring his problem into the same class as a small operator. With such a condition existing, it seems reasonable to assume that service station maintenance would be more economical, considering miles traveled, time out of service, etc., which really should be considered. The successful and economical operation of a fleet of motor vehicles depends very largely upon the extent of its actual uses in the capacity for which it is intended. Let a motor car vehicle cease to function for any cause whatever and at once it becomes an item of expense. Therefore, any legitimate means which may be employed to eliminate time out of service is a further step toward its successful and economical operation.

Before any definite conclusion is reached regarding the advisability of service station maintenance" a careful study should be made of the conditions under which the fleet operates. If it is found that it is broken up into small fleets of say forty vehicles or less, operating in several separate and remote districts, necessitating many miles of travel to and from a central repair station, then self maintenance from an economical point of view would seem out of the question. If after careful study it is decided that service station maintenance is desirable, a thorough survey should be made of the service-station facilities available in the districts from which the vehicles operate. In this connection it is generally understood that service station managers are glad, and usually eager, to get work from responsible concerns. They are also willing to allow a satisfactory discount on work done for such concerns. It is understood that work of this nature is frequently given precedence over other work that is considered of less importance. Arrangements may be made with service stations to do work at night, thereby eliminating the necessity of laying up the vehicles for repairs during the daytime. Arrangements may be made also to have the painting done over week ends in order that time out of service may be reduced to a minimum.

SPARKS from DETROIT

The Annual Exodus

* * *

Murray Business Grows

* * *

Oakland's Used Car Branch

Fred Kingsbury—Detroit Editor

IT is a rather difficult matter to find many automobile engineers in Detroit this week, due to the fact that the majority of them are in French Lick, attending the sessions of the Society of Automotive Engineers. Large delegations of other officials at the motor car plants also are in French Lick, as these sessions are becoming more popular every year.

* * *

THE Murray Corporation's volume of business has been increased during the current quarter by new contracts for light and heavy stampings. The body division has shown a gradual pick-up since January 1, and is likely to soon have the benefit of two new contracts which will result in a considerable increase in operations. April was the largest month of the year with a total output of 18,000 bodies, and May production is going ahead at approximately the same rate.

* * *

THE Oakland Motor Car Company branch has opened the largest used car store in Detroit. It has plenty of space to display 100 automobiles and it will be used as the used car outlet for the Detroit retail branch. It will be operated under the supervision of Harvey Tyrrell, manager of the branch, who has appointed Jack Taylor as manager. One of the interesting features of the building is that the entire front may be thrown open during the summer months.

* * *

The trek to automobile plants has begun. Officials say the increase in the number of visitors at the various factories in Detroit has been large in the last three weeks.

* * *

DR. R. TENEROWICZ, mayor of Hamtramck, a motor manufacturing city within the limits of Detroit, is a thoroughly motorized mayor. He has just taken delivery on the thirty-second motor car he has owned, which, needless to say, is a product of his city.

* * *

J. A. CALLAHAN, formerly vice-president and general manager of the Martin Parry Corporation and recently manager of the Buffalo plant of the Curtiss-Wright Corporation, has become associated with the Briggs Manufacturing Company, Detroit.

Ford Dealer's Salesmen Keep Own Prospect Files

T. B. MARTINDALE USES NOVEL PLAN

Service Is a High Point And Used Car Dept. Profitable

By K. H. LANSING

ON an average, Thomas B. Martindale, Inc., Philadelphia's outstanding Ford dealer, sells from 1,200 to 1,500 new cars a year. This year, sales of Model A cars have reached the 2,000 mark. Some of the agency's fifteen salesmen occasionally dispose of as many as 150 cars a week. Salesmen who make only eight sales or less a week, are classified as "junior" salesmen and eliminated from floor duty — which is allotted only to men having especially good records —and shifted to selling used cars, though under the supervision of really good used car salesmen.

M. H. Rau, the sales manager, has put into practice a plan whereby the men do not go on floor duty in regular rotation, which is a common system, but on assignment based upon the good standing of their individual sales records. In other words, the number of periods a salesman has on the floor depends upon the ratio of his accounts to the agency's business. No one not a good salesman is thus scheduled, with this idea in view: The prospect who enters the salesroom is regarded as about half-sold, anyway. Why, then, permit a man not sure of himself, or of whose sales ability the agency is not convinced, to run the risk of bungling the transaction and turning the customer away?

It was realized, when the new floor period plan was about to be put into operation, that because of its departure from the rotation method, some salesmen might deem it not entirely fair. Hence, all were assured in advance that it was fair and logical and that it was going through. It has worked out well from its inception.

* * *

AND here's another unusual plan in operation that is progressing satisfactorily: Every salesman is expected, up to a certain point, to be a self-starter. If it is found that he isn't, he is in the wrong pew.

For example, on new business, it is supposed that the selaesman's self-interest, if nothing else, will prompt him to find and follow up assiduously as many prospects and close as many deals as he can. To this end he is permitted to keep his own prospect file. It is well known that, ordinarily, not all salesmen's reports to a sales manager are as accurate as they might be, or mean as much in the last analysis as they ostensibly do when presented. The true value inheres what the salesman actually is accomplishing, not in what he may sometimes try to lead a salesmanager to think through a report. The man who cannot, or who will not achieve results without undue prodding and who habitually hands in excuses instead of contracts, is hardly a valuable acquisition to the sales staff of a progressive dealer.

The agency, however, keeps a very complete customer file on old, or established business, which it follows up with extreme care, having the salesmen report regularly thereon. Each salesman is supposed to follow up every one of his old accounts at least once a month. The office, by checking the salesman's report, as soon as it comes in, against the service report for the customer, is able to obtain a pretty fair picture of what the salesman has been doing with this account. In cases where a job is right and, for some reason, the customer thinks it is wrong, it is up to the salesman to convince him that it is right. This is considered part of his duty.

* * *

WHEN Mr. Martindale, in 1922-1923, put up his $300,000 sales and service building at Broad Street and Allegheny Avenue, embodying many of his own ideas and containing numerous other notable features, it was with the idea that the automobile never had been properly merchandised; that dealers had persisted in fiting up expensive showrooms into which only 15 per cent. of their customers enter, and had been allowing their service stations, into which 85 per cent. of their patrons come, to be four bare walls and a few machines, not any of the whole any too interesting and perhaps much of it not particularly clean, accordingly Mr. Martindale, while erecting his building then described as a "Ford car merchandising palace," containing upwards of 50,000 square feet of floor space, with a showroom done in Travertine marble, in Italian Renaissance style, installed as well an exceptional service department. It is all in white—glossy white tile paneling on the walls to a height of four feet and above that white plaster—with a full supply of mechanical equipment. The tile paneling is washed daily.

The service department, which is on the main floor, is devoted to minor repairs and adjustments not requiring repair shop labor. There is a customers' waiting room next to the cashier's office so that when a service job is finished the customer can be quickly notified, pay the cashier, whose office adjoins, and receive a pass to take out his car. When the customer first arrives for service he drives into what is, in effect, the center of a large automotive equipment store. He alights in front of an iron railing in front of a row of display cases wherein are parts and accessories; then he proceeds to the service room and thence to the waiting room where there are more display cases.

"Service first—then sales," is the slogan of Mr. Martindale, who is convinced that "a good service station sells more cars for the dealer." Service, in fact, always has been of great business value to this agency. The plant is now averaging about 125 service and repair jobs daily on cars and trucks. While "quick service," or minor repairs and adjustments are plenty, the only really active major jobs are on wrecks in which there has been a tremendous increase. Overhaul jobs have greatly fallen off, it is explained, owing largely to the superior Model A car. The agency has six diagnosticians, as service salesmen here are called, the former term being considered preferable to the latter, as the house does not care to project the word "sale" into the service department. The diagnosticians are posted during the day in front of the parts and accessories display cases visible from the drive-in and there await the coming of customers. These men are all practical workers and may make some adjustments and small repairs in addition to selling service.

The regular repair department, complete with the most modern equipment, is on the second floor, and contains 22,000 square feet of floor space. It is reached from outside by a ramp. There are forty-five mechanics and, all told, sixty employees aside from the office force. The shopmen are paid on an hourly basis. Some of the mechanics have been with the concern for twelve years, but the average mechanic remains about four, which is a very low rate of labor turnover for this department. Standard Ford flat rates on shop operations are charged to the customer, so the department is able to quote a definite price on each.

* * *

ABOUT $100,000 worth of parts are sold annually. This department has three separate selling sides, namely, toward the salesroom; toward the retail part sales section and toward the service department. The stockroom occupies space fifty feet by 100 feet and is located in the rear of the salesroom.

The used car department not only stands on its own feet, but clears a profit, and the stock is kept down to a minimum. Against this department is charged at list price anything purchased for used cars, as well as any work done on them—which is very little, for the house makes a practice of selling its exchange cars "as is." The salesmanager for the agency also is used car salesmanager. However, he settles no disputes between salesmen over any phase of a sale—they are required to adjust their own differences. This is as true of the new car department as it is for used cars. The salesmen themselves appraise the customer's used car taken in a deal—which is another angle not altogether usual.

In open weather, the used car sales department is outside, the automobiles being lined up against the Alleghaney Avenue side of the building, facing the street. Overhead are electric lamps to illuminate the area at night. The motto of this department is: "Quality Automobiles—and Few of Them." The salesmen are careful about the condition of the cars accepted in exchange, so that it is a comparatively easy matter to resell them "as is." In the case of a used car sale, the customer gets a receipt for a $5 deposit and on this slip is printed in bold type the announcement that the car is being sold on that plan. It also states on the receipt that should the customer fail to take the car and pay for it in full, the $5 deposit is forfeited and will not be repaid. The idea is that the customer either wants the car, or he does not; and if he finally decides not to take the car he forfeits the money as damages. He may, for instance, through his indecision have prevented the prompt sale of the automobile to somebody else. It is on this side of the building, visible from the street in entrances, that two large, high-pressure lubrication racks are located.

DEALER DOINGS

Buffalo, N. Y., May 28.—The Robert Donner Company, headed by Robert Donner, with headquarters at 1244 Main St., has been appointed Duesenberg dealer for Buffalo and western New York. Complete display and service facilities have been provided. H. R. Vannier has been appointed general manager.

East Orange, N. J., May 28.—The Orange Used Car Company has been formed here with a capitalization of 250 shares no par by Robert J. Reilly, Stanley Vanagas and Henry J. Camby, East Orange.

Hartford, Conn., May 28.—Universal Motors, Inc., new Ford dealer, has formally opened a remodeled sales and service building at 971 Farmington Ave., formerly occupied by Seymour & Michaels, Inc. An addition made on the front of the building provides a salesroom of sufficient size to accommodate a full display of Fords.

Toledo, O., May 28.—Harry C. Dayton has opened a Ford dealership here at Woodville Street and Terminal Railroad. Associated with him in the company are Clara N. Dayton and Albert H. Miller. Two hundred and fifty shares of no par stock will be issued.

Hartford Dealers Pepping Up Ads to Move Used Cars

Hartford, Conn., May 28.—An interesting phase of local dealer activities this season as compared with former years is the unusual amount of display newspaper space devoted to used cars. In a number of instances where factory copy is being used, used car copy is the order rather than new car copy. In cases where a schedule is received for a month's advertising, new car copy on the list has been set aside and used car copy substituted.

The used car copy this season has all the dignity of new car copy and the thought hammered home is that the used car end of the business is dignified. Values are especially stressed.

Practically all dealers appear to be more concerned with reducing the used car inventories rather than with new cars, and every effort is being made to move the used car stocks.

In order to overcome the tendency of buyers to purchase low priced new cars, dealers stress the point that a thoroughly good used car which is larger and rides comfortably is to be preferred, at the same outlay.

EX-JOBBER SALESMAN NOW FORD DEALER

Le Roy N. Y., May 28.—Harrison M. Bradbury has taken the Ford dealership for this village and vicinity and has leased the Ralph W. Strobel Garage in Bank Street for sales and service, taking possession June 1. Mr. Bradbury just resigned as salesman for the Chapin-Owen Company in Rochester, jobbers of automobile accessories, effective May 24. He had been traveling through western New York territory for the firm for the past eleven years, during which time he gained a wide acquaintance with automobile men.

Personal Briefs

Hartford, Conn., May 28.—Matthew J. Maloney, formerly associated with the sales force of the Delaney Chevrolet Company, recently resigned from that organization and has accepted a berth with the new Ford dealership, Universal Motors, Inc., at 971 Farmington Ave. Maloney is service manager of the new Ford dealership.

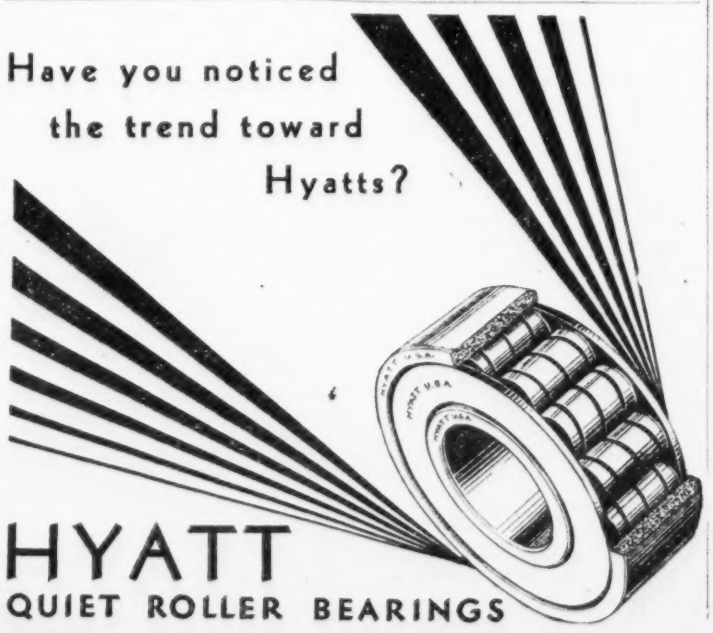
Buffalo, N. Y., May 28.—George C. Lewis, vice-president and general manager of the Nash-Buffalo Corporation, has resigned and will take up the management of an automotive business in Brooklyn, N. Y. W. H. Clegg, who for some time past has been vice-president and general manager of the Nash Sales Company of Syracuse, a subsidiary of the Nash-Buffalo Corporation, has been appointed Mr. Lewis' successor here.

East Orange, N. J., May 28.—Announcement has been made by W. C. Ubhaus of W. C. Ubhaus, Inc., Ford dealer, of 355 Central Ave., of the appointment of the following to his sales staff: E. H. Somer, H. Culver, former sales manager for Newark Motors; Tom Beals, who becomes used car manager; Tom Holmes and E. S. Trapp, the latter a former Ford dealer at Camden, S. C.

Spokane, Wash., May 28.—R. L. Montelius, for many years wholesale manager and later director of retail sales of Wells Chevrolet Company, has been named director of sales for C. H. Wells, Inc., of Seattle. C. H. Wells is head of both firms. William Ryan of the Seattle firm has been named assistant to Mr. Wells. At Spokane Lloyd Bennett, used car manager, becomes director of sales.

NEW FORD DEALER

Lima, N. Y., May 28.—Warren Hayes and Leon Andrews, formerly employed by the West Avenue Garage, Inc., Ford dealers, at Canandaigua, have opened a Ford sales and service dealership here.



"WE appreciate the helpful advertising, mail campaigns, films and road signs—a large factor in our sales results."

—Page & McLain
Pontiac, Mich.

Write or wire for franchise details

WILLYS-OVERLAND, Inc.
TOLEDO, OHIO

WILLYS-OVERLAND SALES CO., LTD., TORONTO, CAN.

Automotive Daily News

"Of, By and For the Entire Automotive Industry"

Published Every Day Except Sunday and Monday by
AUTOMOTIVE DAILY NEWS PUBLISHING CORPORATION,
350 Hudson St., New York, N. Y.
O. J. Elder, President. H. A. Tarantous, Vice-President. Alexander Johnston, Secretary.

Entered as second-class matter August 27, 1925, at the post office at New York, N. Y., under the Act of March 3, 1879.

Circulation—Net paid Average over 10,000 daily guaranteed.
Member A. B. C.

THURSDAY, MAY 29, 1930

ADVERTISING AND BUSINESS HEADQUARTERS
2716 Graybar Bldg., New York, N. Y. Telephone LEXington 6388

Harry A. Tarantous, Business Manager. J. Edward Schipper, Eastern Manager. George M. Slocum, Manager Detroit Bureau, 427-8 Fisher Building, Detroit, Mich., phone Empire 3500; Willard H. Cotton, Western Manager, 333 North Michigan Ave., Chicago, Ill., phone Central 5936; Metz B. Hayes, New England Manager, Little Building, Boston, Mass.; Blanchard, Nichols & Coleman, American National Bank Building, San Francisco, Cal.; Lincoln Building, Los Angeles, Cal.; 1037 Henry Building, Seattle, Wash. **Address ALL advertising and business correspondence to 2716 Graybar Building, New York City.**

EDITORIAL DEPARTMENT
350 Hudson St., New York, N. Y. Telephone CANal 1000
Alexander Johnston, Editor. William C. Callahan, News Editor.
Detroit Bureau—Fred Kingsbury, Editor, 427-8 Fisher Building, Detroit, Mich., phone Empire 3500. Contributing Editor, John C. Wetmore.

Mail subscriptions to CIRCULATION DEPARTMENT—C. H. Wilson, Manager.
1926 Broadway, New York, N. Y. Telephone TRAfalgar 4500
Subscription Rates—One year, $12.00; two years, $20.00, for United States and Canada. To Foreign Countries—One year, $15.00; two years, $26.00. Single copies, 10 cents.

Resourcefulness

ONCE upon a time there was an honest tiller of the soil who owned and operated a herd of cows. He sold the resulting milk at a nearby creamery and it was his frugal habit as he drove his morning consignment thither to stop at a pellucid brook and add a seemly mixture of pure water to the contents of his cans. This did the customers no harm and pleasantly increased the total of the farmer's bill against the creamery.

Now it happened one morning that in adding the clear, pure water to the milk, the farmer carelessly scooped up two frogs. The unfortunate little creatures, snatched from their native dwelling place swam distractedly side by side in the darkness of the milk can. After long minutes of this one frog said to the other: "I'm through. I can't swim another stroke." Whereupon he sank and passed on to his fathers. But the other frog was made of sterner stuff, and he refused to give up the fight. He swam and he swam and he swam. His legs felt so tired that they were numb, but still he kicked manfully for his life. When the cans finally reached the creamery, one of the hired men took off the cover of one of the receptacles and there sitting on a small gob of butter sat our heroic frog. Refusing to yield weakly to circumstances, he had churned himself a life raft and ridden to safety.

Perhaps we may be pardoned the allegory when we say that automobile dealers in 1930 can profitably take a lesson from the feat of the determined frog.

In a recent issue of The Automotive Daily News the Gabriel organization carried a piece of advertising copy which was very much to the point, as follows: "Mr. Car Dealer are you going to wait for better business to come or take some real action now?" the advertisement asked. "If you can't interest a prospect in a new car make your profit selling him a better ride, more comfort in the old one."

That is mighty sound advice. There are not going to be as many cars sold in 1930 as were disposed of in 1929. A good many people who would normally have bought new vehicles this spring are cautiously holding on to their old mounts. A tremendous delayed market is piling up, the benefit of which we shall reap later, but never mind that now. The thing for every dealer to do is to show his resourcefulness and turn the situation as it exists to his own profit. Service sales should soar this year. The man who is waiting a bit to buy a new car is a ready-made prospect for a service sale, for a new piece of equipment, for anything that will make the old car comfortable and efficient.

Careless Accidents

ONE of the interesting points brought out by the recent report of the committee on traffic accidents to the National Conference on Street and Highway Safety is the number of mishaps caused by lack of proper maintenance. The committee finds that 15 per cent. of all traffic accidents are caused by improper maintenance or by the old age of the vehicle, which is about the same thing.

As a cure for this condition the committee suggests that as a prerequisite for renewal of license plates for any car four years old or older, a certificate of mechanical condition should be required. The committee also would have state motor vehicle commissioners invested with the right to remove from the highways any vehicle found to be unsafe.

We are not much in favor of "passing a law" to secure a benefit of this kind. The automobile manufacturing companies with their junking plans are attacking the problem in the logical manner. The manufacturers' junking plan places the problem on a purely economic basis, where in truth it belongs. Removing junk cars from the road is a sound business measure. Persuading the motoring public that it is dangerous to drive vehicles that are not in sound running condition is a function of education. Passing laws to compel caution will probably do little more than set people devising ways of avoiding the force of the statute.

Car Dealers Should Go After Maintenance Business

COMMENT and criticism of the editorial, "Dealers and Distributors Make an Extra Billion This Year," which appeared in Automotive Daily News May 15, are published herewith.

Your views on who shall benefit from the billion dollars spent yearly for automobile maintenance are invited. The editorial in question did not refer to the operations of service specialists.

WANTS DEALERS AND OWNERS TO HEAR MESSAGE

The double space service announcement over your signature in the Automotive Daily News of May 15 has been very favorably commented on by several of the officials of this company.

It has been suggested that we obtain reprints of this announcement of yours for the purpose, first, of sending them to our own distributors and dealers, and, second, recommending to our distributors and dealers that they make a general mailing to their owners. We have approximately 1,500 dealers and distributors, and our owners' list runs up far into the tens of thousands.

I am wondering if you would be willing to supply us with a sufficient number of reprints of this statement for our own distributors and dealers, and quote us a price on additional quantities for the purpose above outlined. Kindly let us hear from you in this regard at once, so that we may make our plans accordingly.

Very truly yours,
NICHOLAS MOORE,
Advertising Manager,
Marmon Motor Car Company,
Indianapolis, Ind.

A TIMELY ARTICLE

I think that your article is timely and it is hoped that it will do some good in bringing to the attention of the automobile merchant the fact that he must be on his toes in placing himself in a position to meet this type of competition.

The ideas advanced by you are a good deal along the line of those which we use in our service talks to Nash dealers, although we do not spend much time in criticizing the "one-stop" station, but do point out to the dealers the fact that in order for them to retain business, they must place themselves in a position to take care of service work in a prompt way, the mechanics being dressed neatly and the premises sufficiently attractive, so that there is an appeal to the driver to stop and have his work taken care of in their place of business and, also, that they must be in a position to take care of any type of service which the owner may desire, such as gasoline, oil, wash and polish, storage, tire repairs, electrical repairs, and in fact everything that pertains to the proper maintenance of whatever transportation the automobile owner may be using.

L. L. VIRGIL,
Service Manager, Nash Motors Company, Kenosha, Wis.

PHELPS, INC., TAKING OVER ADVERTISING ACTIVITIES OF REO

(Continued from Page 1)

the Reo house organ. Mr. Wilcox, an expert in truck advertising and merchandising, will be occupied with Reo Speed Wagon, and Capt. Leavell will be available for general activities in connection with all branches of the business.

Under the new arrangement all Reo advertising—passenger car and truck, also all publicity and promotional work—will come under the Phelps company supervision. The Phelps men are no strangers in the Reo midst. For several years they have been caring for the Reo foreign advertising account, which branch of the business showed an appreciable increase in 1929.

Reo newspaper and magazine schedules will continue essentially as originally contemplated for the year, and will be augmented by intensive sales promotion activities.

FISHER BROTHERS BUY INTO ATLANTIC-PACIFIC OIL

New York, May 28.—Announcement was made today that a group headed by John Hays Hammond and Harris Hammond, and reported to include the Fisher Brothers of Detroit, had obtained control of the Atlantic-Pacific Oil Exploration Company through the purchase of 1,212,300 of the 2,000,000 shares, representing the total authorized capitalization of the company.

COMING EVENTS

MAY

27-29—**Washington, D. C.** National Conference on Street and Highway Safety
25-29—**French Lick Springs, Ind.** Society of Automotive Engineers' summer meeting
30—**Indianapolis, Ind.** Automobile Race

JUNE

5-**New York.** National Automobile Chamber of Commerce annual meeting.
9-12—**Detroit, Mich.** American Society of Mechanical Engineers' semi-annual meeting.
23-26—**San Francisco, Cal.** Meeting American Electric Railway Association
23-27—**Atlantic City, N. J.** American Society for Testing Materials annual meeting at Chalfonte-Haddon Hall.
26-28—**White Sulphur Springs, W. Va.** Steel Founders Society summer convention.
29-July 13—**Posen, Poland.** International Motor and Transport Show.

AUGUST

26-28—**Chicago, Ill.** Society of Automotive Engineers aeronautic meeting in conjunction with National Air Races.

SEPTEMBER

22-26—**Chicago, Ill.** American Society for Steel Treating meeting at Stevens Hotel.
29-Oct. 4—**Pittsburgh, Pa.** National Safety Council Annual Safety Congress.

OCTOBER

2-12—**Paris, France.** Automobile Salon.
6-11—**Washington, D. C.** Sixth International Road Congress.
6-11—**Washington, D. C.** American Roadbuilders' Association Convention.
8- 9—**Detroit, Mich.** Society of Automotive Engineers production meeting at Book-Cadillac Hotel.
22-24—**Pittsburgh, Pa.** Society of Automotive Engineers' transportation meeting.
16-25—**London, England.** Olympia Motor Show.

NOVEMBER

6-16—**Berlin, Germany.** International Automobile Show.
8-15—**Chicago, Ill.** Automobile Salon at Drake Hotel.
10-14—**Cleveland, O.** Motor and Equipment Association Show.
17-22—**Cleveland, O.** National Standard Parts Association Show.
30-Dec. 6—**New York.** Automobile Salon at Hotel Commodore.

DECEMBER

6-17—**Brussels, Belgium.** Automobile Exhibition.

JANUARY

3-10—**New York.** National Automobile Show.
24-31—**Chicago, Ill.** National Automobile Show.

Ask Us To Tell You—

IN presenting this service department, The Automotive Daily News is actuated by the desire to help its readers solve their problems, whether these are merchandising, technical or in the field of general automotive information. We shall be glad to have our readers ask us any questions pertaining to the automotive field.

In some instances readers may desire information which will require an expenditure of money to secure, and in such cases we shall be glad to get the desired data at the least possible cost, or we shall inform our readers where they may obtain it most economically and expeditiously.

In cases where the reader desires an immediate reply, we would suggest that he inclose a self-addressed and stamped envelope. Other inquiries will be printed in the paper from day to day in the order in which they are received.

QUESTION: Will you please let me have a list of entries, both cars and drivers, for the Indianapolis Decoration Day race as soon as possible?
CHARLES H. DOWNS, Ashland, O.

ANSWER:

ENTRANT	CAR	DRIVER
Bill White	Miller Hi-Speed Spl.	William (Shorty) Cantlon
Leslie Allen	Unnamed	Leslie Allen
Alfieri Maserati	Maserati	Baconi Borzacchini
Coleman Motors Corporation	Coleman Front-Drive	Lou Moore
Coleman Motors Corporation	Coleman Front-Drive	Phil Shafer
Alden Sampson, 2d	Sampson Special	Louis Meyer
Peter De Paolo	Duesenberg	Peter De Paolo
Peter De Paolo	Duesenberg	Bill Cummings
Harry Hartz	Miller Front-Drive	Harry Hartz
Zeke Meyer	Unnamed	Zeke Meyer
Allen Guiberson	Guiberson Spl.	Ernie Triplett
Louis F. Schneider	Unnamed	Louis F. Schneider
James Talbot, Jr.	Mavy Carburetor Spl.	Anthony Gulotta
James Talbot, Jr.	Mavy Carburetor Spl.	Melvin Keneely
Julius Claude Slade	Slade Special	J. C. Slade
William Alberti	Empire State Special	Wilbur Shaw
James H. Booth	Buckeye Special	Chester Gardner
Bessie Decker	Decker Special	Rick Decker
Russell Snowberger	Russell Eight	Unnamed
Du Pont Motors, Inc.	Du Pont	Charles Morgan, Jr.
Fred M. Fansin	Fansin Jr. Spl.	Fred M. Fansin
Morton & Brett	Morton & Brett Spl.	James Klemos
William H. Richards	Romthe Spl.	J. C. MacDonald
George A. Henry	Unnamed	Cy Marshall
Harry A. Butcher	Butcher Brothers Spl.	Harry A. Butcher
Ira Vail	V-Eight	Claude Burton
David Evans	Unnamed	David Evans
M. A. Yagle	Betholine Special	Frank Farmer
W. H. Gardner	Unnamed	W. H. Gardner
Thomas J. Mulligan	Fronty Special	Chester Miller
Letterio Piccolo Cucinotte	Maserati Special	Letterio Piccolo Cucinotte
Auto Engineering & Machine Co.	Ambler Special	G. D. MacKenzie
Garbriel Nardi	Nardi Special	William Denver
M. M. Lain	Trexler Special	Marion Trexler
Henry Maley	Duesenberg Special	Deacon Litz
Herman N. Gauss	Unnamed	Jonny Seymour
Herman N. Gauss	Unnamed	Joe Huff
Clemons Motors, Inc.	Hoosier Pete Special	Unnamed
A. S. Duesenberg	Duesenberg Special	Egbert (Babe) Stapp
A. S. Duesenberg	Duesenberg Special	Unnamed
Rollin May	J. M. Special	Rollin May
Sam Greco	Scranton Special	Sam Greco

S. A. E. Program

Activities at the Summer Meeting at French Lick Springs Hotel, French Lick Springs, Ind., May 25-29

THURSDAY, MAY 29

10.00 A. M.—Aircraft and Aircraft Engines

"A Comparative Study of Power Plant Engineering for Motor Cars and Aircraft," H. M. Crane, General Motors Corporation.

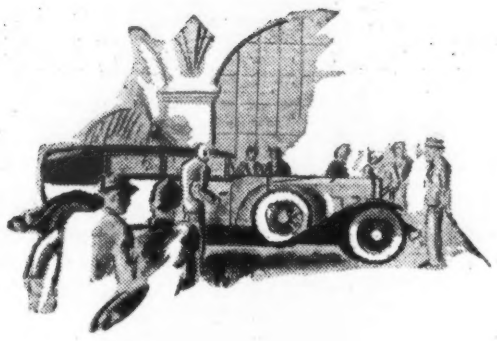
"Speed," Lieut. Carl B. Harper, Bureau of Aeronautics.

10.00 A. M.—Research

"Engine Acceleration," C. S. Bruce, Bureau of Standards.

"Effects of Weathering in the Tank on the Vapor Locking Tendency of Gasolines," O. C. Bridgeman and E. W. Aldrich, Bureau of Standards.

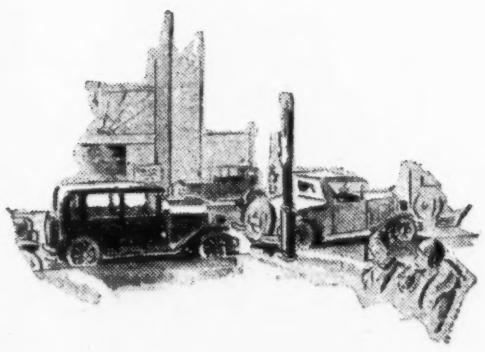
"Vapor Lock," W. C. Bauer, Standard Oil Company.



High incomes buy more costly cars

BUT

the masses buy more cars!



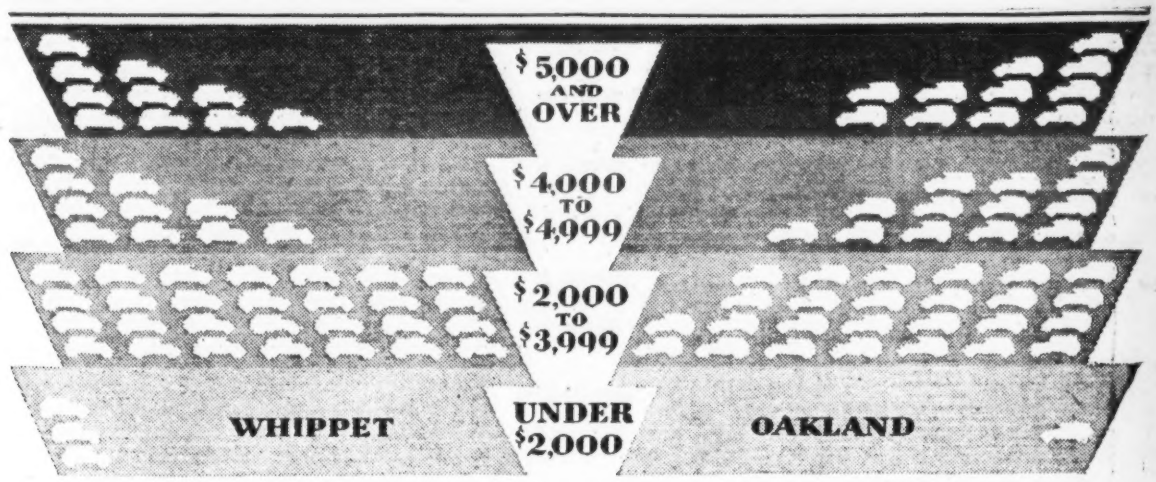
THE NEWS

New York's Picture Newspaper

220 EAST FORTY-SECOND ST., NEW YORK

Tribune Tower, Chicago—Kohl Bldg., San Francisco

WHIPPET made 55.4% and OAKLAND 51.3% of 1929 New York City sales in $2000—$4000 districts



$5,000-and-over districts furnished 19.5% of Whippet sales—21.6% of Oakland sales
$4,000-$4,999 districts furnished 19.8% of Whippet sales—25.7% of Oakland sales
$2,000-$3,999 districts furnished 55.4% of Whippet sales—51.3% of Oakland sales
Under $2,000 districts furnished 5.3% of Whippet sales—1.4% of Oakland sales

Source: The News 1929 New Car registration analysis

AN Isotta draws eyes on Fifth Avenue as well as on Woodward. And a Cadillac V16 collects our curb-stone curious because (movie glitter to the contrary) expensive cars are exceptions even in New York.

Here as elsewhere most cars sold are low or medium priced, most buyers middle-incomed. In 1929, 88% of New York City sales were at or below $1,950; of these, 56% went to $2,000-$4,000 districts.

Moderate income families furnished volume to most makers, bought better than half each of

—thirty of 44 different models priced below $1,950 (88% of total sales).

—twenty-seven of 30 different models under $1,450 (76% of total sales).

—seventeen models—every car—priced below $1,050 (58% of total sales).

Few picked very low priced cars. Ford with 41% of national sales in March—got only 19% in these districts!

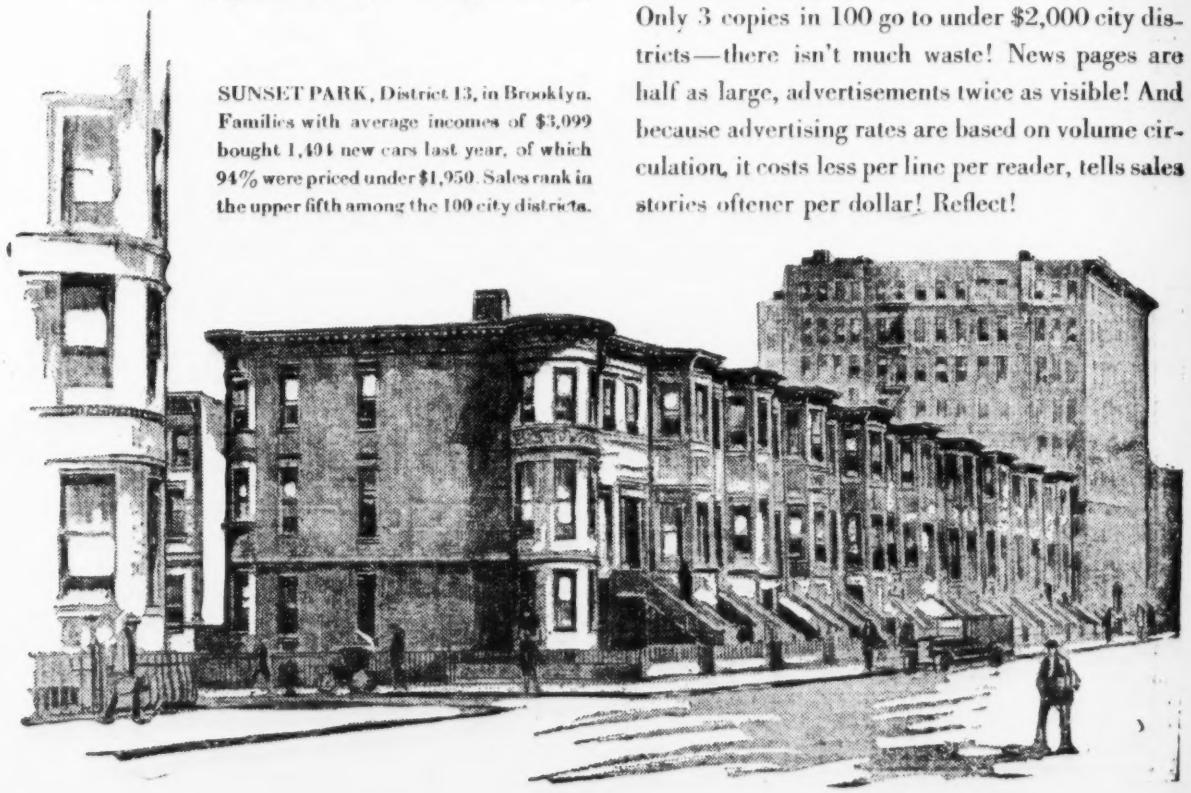
And mass neighborhoods gave Whippet 55.4%, Oakland 51.3% of local sales. Brooklyn and Queens middle-class alone bought more than all Manhattan. Common people are best customers, volume buyers, for almost everyone's cars! (Facts based on 1929 News passenger car analysis by districts, models, makes. Sent free.)

YOU can sell more high priced cars to wealthy customers. But the bulk of most lines goes to the middle-incomed in all markets, even New York.

And you can reach—and sell—most of them through the single paper most read . . . The News!

Concentrates 589,000 copies, 45% of circulation in high volume districts, reaches *seven* families in *ten*, gives dense coverage of car owners and prospects other papers miss. (Papers "A" and "B", most used for car advertising, have over 75% of circulation in other sections, reach respectively only 7% and 11% of middle-class families.) The News has an additional quarter million readers in the over $4,000 districts, more than any other paper, and nearly 200,000 more in the suburbs. Only 3 copies in 100 go to under $2,000 city districts—there isn't much waste! News pages are half as large, advertisements twice as visible! And because advertising rates are based on volume circulation, it costs less per line per reader, tells sales stories oftener per dollar! Reflect!

SUNSET PARK, District 13, in Brooklyn. Families with average incomes of $3,099 bought 1,404 new cars last year, of which 94% were priced under $1,950. Sales rank in the upper fifth among the 100 city districts.



IN THE ACCESSORY AND SERVICE FIELD

Union City, N. J., May 28.—The Motor Aid Corporation, repairing automobiles, has been formed, with an authorized capitalization of $125,000, by Howard W. Boulter, Union City; Frederick Monsees, Rochelle Park, and Henry J. Monsees, Montclair.

Fort Worth, Tex., May 28.—The Firestone Service Stores, Inc., one-stop station, just completed here at a cost of $200,000, formally opened today. The company, a local concern, is readed by Harry E. Brants, well known insurance man. R. W. McCann is vice-president and J. W. Spring secretary of the company.

Trenton, N. J., May 28.—George P. Ellerman, of West Palm Beach, Fla., has leased the garage of Edward E. Myers, 41 Ringold St. Possession will be taken at once by Mr. Ellerman for the conducting of a general garage business.

Daytona Beach, Fla., May 28.—Florida Tire Sales Company, Inc., has just been organized here by E. H. Sullings, J. R. Huckabee and M. K. Huckabee. The capital stock is 100 shares, par value $100 each.

Nashville, Tenn., May 28.—E. E. Patterson has been appointed manager of the Old Hickory branch of the Blackwood Tire Company. He has been with the company for a number of years.

Toledo, O., May 28.—J. F. Mullaney and R. J. Wilhelm, manager and shop foreman of the Ace Garage here for ten years, have organized the A. A. Service Garage here, located at 106-108 13th St.

Buffalo, N. Y., May 28.—Francis P. McKeating, 898 Washington St., has acquired the business of the Eisenhaus Battery Exchange in this city and plans to continue its operation, specializing in the sale and purchase of all makes of batteries and automotive electrical equipment.

Perth Amboy, N. J., May 28.—The Auto Brake and Wheel Service, Inc., repairing automobiles, capitalized at $100,000, has been formed by William B. Siegfried, Philip Borak and Bessie Siegfried, Perth Amboy.

Racine, Wis., May 28.—Notice has been filed in the office of the register of deeds here by Arvid Hedlund, Theodore Erickson, Adolph Erickson and Alfred Johnson that they are co-partners in the L. H. J. Manufacturing Company, and will engage in the manufacture and sale of valves, piston pins and other automobile accessories.

Richmond, Va., May 28 (UTPS).—Announcement has been made of the resignation of F. X. Farnan, for many years secretary and assistant treasurer of the McClaren Rubber Company, from active service with the concern. Farnan went to Racine, Wis., when the financial division of the McClaren company was moved to that city. Charlotte interests, however, required him to be in that city the major part of the time and it was this condition that caused his decision to retire from active work with the company, it was announced.

Hackensack, N. J., May 28.—The John F. Novak Company, Inc., 106 Johnson Ave., this city, has been incorporated to take over the automobile body and repair business now conducted under the name of John F. Novak. The authorized capitalization is $125,000. The incorporators are Anna Novak, John F. Novak, John A. Nugent and Emily A. Nugent, all of Hackensack.

CURRENT PRICES OF PASSENGER CAR MODELS

AUBURN—6-85. 120 W. B.

Sport Sedan	995	Sedan	1,095
Cabriolet	1,095		

AUBURN—8-95. 125 W. B.

Sport Sedan	1,195	Cabriolet	1,295
Sedan	1,295	Phaeton Sedan	1,395

AUBURN—8-125. 130 W. B.

Sport Sedan	1,495	Cabriolet	1,595
Sedan	1,595	Phaeton Sedan	1,695

BLACKHAWK—6 or 8 cyl. 127½ W. B.

5 Coupe	1,995	4 Speedster	2,535
5 Sedan	2,395	7 Cab. Coupe	2,595
2 Coupe	2,395	4 Speed. (T.C.)	2,735
2 Speedster	2,535		

BUICK—"40" 6-cyl. 118 W. B.

2 Bus. Coupe	1,260	4 Spt. Roadster	1,310
5 2-dr. Sedan	1,270	5 Phaeton	1,310
4 Special Coupe	1,300	5 4-dr. Sedan	1,330

BUICK—"50." 6-cyl. 124 W. B.

4 Coupe	1,510	5 4-dr. Sedan	1,540

BUICK—"80." 6-cyl. 132 W. B.

4 Roadster	1,585	5 4-dr. Sedan	1,760
7 Phaeton	1,595	7 4-dr. Sedan	1,910
4 De L. Coupe	1,695	7 Limousine	2,070
5 Coupe	1,740		

CADILLAC—8-cyl. 140 W. B. Fisher Custom

2 Coupe	3,296	5 Sedan	3,695
5 Town Sedan	3,495	7 Sedan	3,795
2 Con. Coupe	3,595	7 Imp. Sedan	3,995
5 Coupe	3,595		

CADILLAC—8-cyl. 140 W. B. Fleetwood Custom

2 Roadster	3,450	5 Sedanette	4,595
5 Sedan	4,195	7 Imperial	4,595
5 Sedan Cabrio	4,245	5 A. W. Phaeton	4,700
7 Sedan	4,295	Town Cabriolet	4,995
5 Imperial	4,395	Town Cabriolet	5,145
5 Imp. Cabrio	4,445	Lim. Brougham	5,145
5 Sedanette Cabriolet	4,500		

CADILLAC—V-16. 148 W. B. Fleetwood Custom

2 Roadster	5,350	Town Cabriolet (Leather)	7,150
2 Coupe	5,800		
2 Con. Coupe	5,900	Lim. Brougham	7,150
5 Club Sedan	5,950	7 Sedan	7,225
5 Sedan	5,950	5 Imperial	7,300
5 Sedan Cabrio	6,125	5 Imp. Cabriolet	7,350
5 Phaeton	6,150	A. W. Phaeton	7,350
7 Sedan	6,225	7 Imp. Sedan	7,525
5 Imperial	6,300	Town Cabriolet (Opera seats)	8,750
5 Imp. Cabrio	6,350		
7 Imp. Sedan	6,525	Town Cabriolet (quarter windows)	8,750
A. W. Phaeton	6,650		
2 Coupe	6,850		
2 Con. Coupe	6,900	Town Cabriolet (leather quarters)	8,750
5 Club Sedan	6,950		
5 Sedan	6,950		
Town Cabriolet	7,000	Lim. Brougham	8,750
5 Sedan Cabrio	7,125	Town Brougham	9,200
Town Cabriolet	7,150	Town Brougham	9,700

CHEVROLET—6-cyl. 107 W. B.

Roadster	495	Coupe	565
Phaeton	495	Sport Coupe	625
Sport Roadster	525	Club Sedan	625
Coach	565	Sedan	675
		Special Sedan	725

CHRYSLER—"6." 6-cyl.

Business Coupe	795	Roadster	835
Royal Coupe (R. S.)	835	Phaeton	835
		4-dr. Sedan	845

CHRYSLER—66. 6-cyl.

2 Business Coupe	995	Roadster (RS)	1,025
5 Brougham	995	Royal Coupe (RS)	1,075
5 Phaeton	1,025	Royal Sedan	1,095

CHRYSLER—70. 6-cyl.

5 Phaeton	1,295	Royal Coupe (RS)	1,395
2-4 R'dster (RS)	1,345	Royal Sedan	1,445
2 B'sin's Coupe	1,345	Con. Coupe (RS)	1,545
5 Brougham	1,345		

CHRYSLER—77. 6-cyl.

Business Coupe	1,395	Royal Sedan	1,495
Roadster (RS)	1,665	4 Crown Coupe	1,575
Town Sedan	1,445	Crown Sedan	1,595
Royal Coupe (R. S.)	1,495	5 Phaeton (TC)	1,795
		Con. Coupe (RS)	1,825

CHRYSLER—Imperial. 6 cyl.

2-4 R'ster (RS)	2,995	7 Phaeton	3,195
2 Stan. Coupe	3,095	7 Sedan	3,195
5 Sedan	3,075	7 Sedan Lim.	3,575
2-4 Con. C'p (RS)	3,095	4 Spt. Phaeton	3,955
5 Town Sedan	3,075		

CORD—8-cyl. 137½ W. B.

Sedan	3,095	Cabriolet	3,295
Brougham	3,095	Phaeton Sedan	3,295

DE SOTO—6-cyl.

Roadster	810	De Luxe Coupe	860
Bus. Coupe	830	4-dr. Sedan	875
Phaeton	830	Convertible Coupe	945

DE SOTO—8-cyl.

Business Coupe	965	De Luxe Coupe	1,025
Roadster	985	Touring	1,035
Standard Sedan	995	De Luxe Sedan	1,065

DODGE—Six.

Business Coupe	835	4-dr. Sedan	865
Stn. Coupe (RS)	855	Phaeton	875
Roadster	855	Cn. Coupe (RS)	935

DODGE—Eight.

Roadster (RS)	1,095	Stan. Cp. (RS)	1,125
Cn. Coupe (RS)	1,196	Sedan	1,145

DODGE—Senior Six. 6-cyl. 120 W. B.

5 Brougham	1,545	Roadster (RS)	1,615
4-dr. Sedan	1,595	4-dr. Lan. Sed	1,645
2 Coupe (RS)	1,595		

DODGE—New Six. 6-cyl. 112 W. B.

2 Coupe (RS)	1,595	Phaeton	1,025
Business Coupe	945	DeL. Coupe (RS)	1,025
Roadster (RS)	995	4 Victoria	1,025
5 2-dr. Brough'm	995	4-dr. DeL. Sed	1,065
4-dr. Sedan	995		

DURANT—"40." 4-cyl. 107 W. B.

Coupe	595	4-dr. Sedan	695
Spt. Roadr (RS)	595		

DURANT—"60." 6-cyl. 109 W. B.

Spt. Roadr (RS)	685	4-dr. Sedan	750
Coupe	685		

DURANT—"63." 6-cyl. 112 W. B. (Three Speed Transmission)

Coupe	845	Phaeton	925
4-dr. Sedan	895		

DURANT—"66" 6-cyl. 112 W. B. (Four Speed Transmission)

Coupe (R. S.)	945	Phaeton	1,025
4-dr. Sedan	995		

DURANT—"70." 6-cyl. 119 W. B. (Four Speed Transmission)

Coupe (R. S.)	1,195	4-dr. Sedan	1,285

DURANT—6-14. 6-cyl. (Three Speed Transmission)

Business Coupe	785	*DeL. Coupe	945
Stan. Coupe (RS)	815	*DeL. Phaeton	960
Stan. Sedan	845	*DeL. Sedan	975
*DeL. Roadster	935		
*Six wire wheels.			

DURANT—6-17. 6-cyl. (Four Speed Transmission)

Business Coupe	995	*DeL. Coupe	1,155
Stan. Coupe (R. S.)	1,025	*DeL. Roadster	1,155
Stan. Sedan	1,065	*DeL. Phaeton	1,185
*Six wire wheels.		*DeL. Sedan	1,195

ELCAR—75-A. 6-cyl. 117 W. B.

2 Roadster	995	4 Con. Landau	1,265
4 Roadster	1,245	5 Club Sedan	1,295
2 Coupe	1,245	5 Sedan	1,295
4 Coupe	1,265		

ELCAR—95. 8-cyl. 123 W. B.

2 Roadster	1,395	4 Con. Landau	1,565
4 Roadster	1,535	5 Club Sedan	1,595
2 Coupe	1,545	5 Sedan	1,595
4 Coupe	1,565		

ELCAR—96. 8-cyl. 123 W. B.

4 Roadster	1,635	5 Club Sedan	1,695
2 Coupe	1,645	4 Fleetwing Sed	1,695
4 Con. Landau	1,665	5 Princess Sed	1,695
4 Coupe	1,665		

ELCAR—130. 8-cyl. 130 W. B.

2 Coupe	1,945	4 Con. Landau	1,995
5 Sedan	1,995	4 Roadster	1,995
5 Club Sedan	1,995	5 Touring	1,995
4 Coupe	1,995	7 Sedan	2,120

ELCAR—120. 8-cyl. 127 W. B.

5 Touring	2,465	7 Sedan	2,645
5 Sedan	2,465		

ELCAR—140. 8-cyl. 135 W. B.

4 Roadster	2,645	5 Sedan	2,645
4 Con. Landau	2,645	5 Con. Sedan	2,750

ESSEX—6-cyl. 113 W. B.

2 Coupe	735	Brougham	895
Coupe (RS)	750	Phaeton	925
Coach	765	Roadster	925
Stan. Sedan	825	Sun Sedan	995
Touring Sedan	875		

FORD—Model A. 4-cyl. 103½ W. B.

Pickup Op. Cab	430	Standard Sedan (3 win.)	625
Roadster	435		
Phaeton	440	Cabriolet	645
Pickup Cl. Cab	460	4-dr. De L. Sedan (2 win.)	650
Tudor Sedan	500		
Coupe	500	Town Sedan	670
Sport Coupe	530	Town Car	1,200
De Luxe Coupe	550		

FRANKLIN—Series 145. 125 W. B.

Sedan	2395	Vic. Brougham	2,695
Coupe	2,610	Con. Coupe	2,710
De Luxe Sedan	2,670	Town Sedan	2,725
Club Sedan	2,675	Pursuit	2,750

FRANKLIN—Series 147. 132 W. B.

Salon Special	2,715	Limousine	3,070
7 Sedan	2,875	Sedan Lim.	3,125
Roadster	2,885	Speedster (5 wire wheels)	3,425
5 Pirate Tour	2,885		
7 Pirate Phaet.	2,970		

FRANKLIN—Custom. 132 W. B.

†Dietrich Con. Speedster	3,725	†Holbrook-Avion Sedan	6,300
†Deuville Sed.	5,100	†Locke Con. Sed	7,600
Dietrich Town Car (wood wheels)	5,200	†Dietrich Pirate Coupe	8,300
Derham Cabriol.	6,100		
†Wire wheels.			

GARDNER—Model 150. 130 W. B.

Sport Sedan	1,945	Coupe	1,995
Brougham	1,995	Sedan	2,045
Roadster	1,995		

GARDNER—Model 140. 125 W. B.

Sport Sedan	1,595	Brougham	1,645
Coupe	1,645	Sedan	1,695
Roadster	1,645		

GARDNER—Model 136. 122 W. B.

Sport Sedan	1,195	Brougham	1,245
Coupe	1,245	Roadster	1,245

GRAHAM—6-cyl. Standard. 115 W. B.

2 Coupe	845	2 De L. Coupe (R. S.)	945
5 Town Sedan	845		
2 Coupe (R.S.)	895	5 De L. Sedan	995
2 De L. Coupe	895	2 Roadster (R.S.)	995
5 Univ. Sedan	895	5 Phaeton	1,015
		2 Cabriolet (RS)	1,065

GRAHAM—6-cyl. Special. 115 W. B.

2 Coupe	1,195	5 Sedan	1,225
2 Coupe (R.S.)	1,225		

GRAHAM—8-cyl. Standard. 122 W. B.

2 Coupe (R.S.)	1,445	7 Sedan (134 W. B.)	1,745
5 Sedan	1,445		
		5 Conv. Sedan	1,985

GRAHAM—8-cyl. Special. 122 W. B.

2 Coupe (R. S.)	1,595	7 Sedan (134 W. B.)	1,844
5 Sedan	1,595		
		5 Conv. Sedan	2,085

GRAHAM—8-cyl. 127 W. B.

5 Sedan	2,025	2 Roadster (RS)	2,225
4 Coupe	2,025	2 Cabriolet (RS)	2,245
2 Coupe (R.S.)	2,225	5 Phaeton	2,295

GRAHAM—8-cyl. 137 W. B.

7 Phaeton	2,295	7 LeBaron Limo. Sedan	3,940
5 Sedan	2,455		
5 Town Sedan	2,455	7 LeB. Twn Car	4,255
7 Sedan	2,525	7 LeBar. Limo.	4,505
7 Limousine	2,595		

HUDSON—8-cyl. 119 W. B.

Coach	1,050	Roadster	1,200
Coupe	1,100	5 Phaeton	1,300
Stan. Sedan	1,150	Sun Sedan	1,355

HUDSON—8-cyl. 126 W. B.

Tour. Sedan	1,250	7 Phaeton	1,500
Brougham	1,295	7 Sedan	1,650

HUPMOBILE—Series S Standard. 111 W.B.

Com. Coupe	995	2 Cabriolet (RS)	1,110
Coupe (R.S.)	1,095	5 Phaeton	1,135
5 4-dr. Sedan	1,095	Roadster	1,175

HUPMOBILE—Series C. Standard. 121 W.B.

5 4-dr. Sedan	1,695	7 Phaeton (5 disc wheels)	1,785
2 Coupe (R.S.)	1,695		
5 Vic. Coupe	1,715	5 Town Sedan (5 disc wheels)	1,805
2 Cabriolet	1,770		

HUPMOBILE—Series H. Standard Models.

5 4-dr Sedan	2,080	7 Phaeton (5 disc wheels)	2,190
2 Coupe (R.S.)	2,080		
5 Vic. Coupe	2,100	5 Town Sedan (5 disc wheels)	2,190
2 Cabriolet (RS)	2,155		

HUPMOBILE—Series U.

7 Sedan	2,495	7 Limousine	2,645

JORDAN—70. 8-cyl. 120 W. B.

Sunshine Sedan (collapsible)	1,495		

JORDAN—Standard 80. 120 W. B.

5 Sedan	1,795	Coupe	1,795

JORDAN—Great 90. 8-cyl. 125 W. B.

5 Sedan	2,295	Sport Sedan	2,595
Coupe (Standard)	2,295	Playboy Roadster	2,595
Coupe (convertible)	2,495	Speedboy Sport Phaeton	2,795

JORDAN—Great 90. 8-cyl. 131 W. B.

7 Touring	2,495	7 Sedan Limousine	2,695
7 Sedan	2,595		

JORDAN—Speedway Series. 145 W. B.

"Ace" Roadster		"Sportsman" Sport Sedan	5,550
Phaeton	5,550		

KISSEL—White Eagle 73. 117 W. B.

4-dr Bro. Sed.	1,595	Sedan	1,695
All Year Coupe		Coupe Roadster (Solid Top)	1,695
Rdstr (F.T.)	1,695		

KISSEL—White Eagle 95. 125 W. B.

4-dr. Br. Sed.	1,995	Sedan	2,095
All Year Coupe Rdstr (F.T.)	2,095	Speedster	2,195
		Tourster	2,195
Coupe Roadster (Solid Top)	2,095	A. Y. Broug	2,595
		7 Sedan	2,595

KISSEL—White Eagle. Model 124

All Year Brou.	3,185	4-dr. Brou. Sed	3,275
Coupe Roadster (Solid Top)	3,185	Speedster	3,275
		Tourster	3,275
All Year Coupe Rdstr (F.T.)	3,185	7-Sedan	3,785
		Berline Sedan	3,885

LA SALLE—8-cyl. 134 W. B. Fisher Custom

2 Coupe	2,490	5 Town Sedan	2,590
5 Sedan	2,565	7 Sedan	2,775
2 Con. Coupe	2,590	7 Imp. Sedan	2,925
5 Coupe	2,590		

LA SALLE—8-cyl. Fleetwood. 134 W. B.

5 Phaeton	2,385	5 Sedan Cabrio	3,725
2 Roadster	2,450	5 Sedanette	3,825
7 Touring	2,525	5 Phaeton	3,995

LINCOLN—8-cyl. 136 W. B.

7 Spt. Touring	4,200	Town Sedan (2 windows)	4,400
4 Spt. Phaeton	4,200		
4 Spt. Phaeton (tonneau cowl and windshield)	4,400	Town Sedan (3 windows)	4,400
2 Club Roadstr	4,400	5 Sedan	4,500
5 Coupe	4,400	7 Sedan	4,700
		7 Limousine	4,900

LINCOLN—8-cyl. Custom. 136 W. B.

2 Coupe (Judkins)	5,000	7 Cabriolet (N. C. A. W.) by Le Baron	6,900
4 Coupe Sedan (Le Baron)	5,300	7 Brougham (A. W.) Brunn	7,000
Berline (2 win.) (Judkins)	5,600	7 Cabriolet (S. C. A. W.) Le Baron	7,100
Berline (3 win.) (Judkins)	5,600		
7 Limousine (Willoughby)	5,900	7 Cabriolet (A.W. - non or semi-col.) Brunn	7,200
4 Con. Coupe (Dietrich)	6,200	7 Cabriolet (fully collapsible) by Le Baron	7,200
4 Con. Sedan (Dietrich)	6,600		

MARMON—Big Eight

5 Sedan	2,720	7 Sedan	2,920
5 4-dr. Brough.	2,770	7 Sedan Lim.	3,120
5 4-dr. Clb Sed.	2,770	7 Touring	3,170
2 Coupe (R.S.)	2,850		

MARMON—70. 8-cyl.

2 Coupe (R.S.)	1,995	5 4-dr. Club Sed	2,070
5 Sedan	2,020	2 Convertible Coupe (R.S.)	2,120
5 Phaeton	2,020		
5 4-dr. Brough.	2,070		

MARMON—69. 8-cyl.

2 Coupe (R.S.)	1,495	5 Phaeton	1,610
5 Sedan	1,520	2 Convertible Coupe (R.S.)	1,610
5 4-dr. Brough.	1,565		
5 4-dr. Club Sed	1,565		

MARMON—Roosevelt. 8-cyl.

2 Coupe (R.S.)	995	2 Convertible Coupe (R.S.)	1,175
5 Sedan	1,075		
4 Vic. Coupe	1,145		

De luxe equipment can be had on the Marmon at a moderate additional cost.

MARQUETTE—6-cyl. 114 W. B.

2 Bus. Coupe	990	Special Coupe	1,020
2-dr. Sedan	1,000	(R.S.)	1,060
Roadster (RS)	1,020	4-dr. Sedan	
5 Phaeton	1,020		

NASH—Single Six. 114¼ W. B.

5 2-dr. Sedan	935	5 4-dr. Sedan	1,005
2 Coupe	940	4 Cabriolet	1,005
4 Roadster	975	5 De L. Sedan	1,095
4 Coupe (RS)	980	Folding Landau	1,155
5 Touring	995		

NASH—Twin Ignition Six. 118 W. B.

5 2-dr. Sedan	1,325	4 Coupe (RS)	1,395
2 Coupe	1,345	4 Victoria	1,410
4 Roadster	1,365	5 4-dr. Sedan	1,415
4 Cabriolet	1,385		

NASH—Twin Ignition Six. 128¼ W. B.

7 Touring	1,475	7 Sedan	1,745
5 Touring (Tonneau Cowl)	1,595	7 Limousine	1,920

(Recent price changes in bold face)

NASH—Twin Ignition Eight. 124 W. B.

5 2-dr. Sedan	1,675	5 4-dr. Sedan	1,795

NASH—Twin Ignition Eight. 133 W. B.

7 Touring	1,845	5 Victoria	2,045
2-4 Cabriolet	1,875	5 Ambassador	2,095
2 Coupe	1,915	7 Sedan	2,195
2-4 Coupe	1,975	7 Limousine	2,385
5 Touring (Tonneau Cowl)	1,975		

OAKLAND—8-cyl. 117 W. B.

Roadster	1,025	Sport Coupe	1,115
Coupe	1,045	4-dr. Sedan	1,145
2-dr. Sedan	1,065	Custon Sedan	1,195
Phaeton	1,075		

OLDSMOBILE—6-cyl. Standard. 113½ W.B.

2-dr. Sedan	895	4-dr. Sedan	995
Coupe	895	Con Roadster	995
Sport Coupe	965	Pat. Sedan	1,060
Phaeton	965		

OLDSMOBILE—6-cyl. Special. 118½ W. B.

2-dr. Sedan	970	4-dr. Sedan	1,070
Coupe	970	Con. Roadster	1,070
Sport Coupe	1,040	Pat. Sedan	1,135
Phaeton	1,040		

OLDSMOBILE—6-cyl. De Luxe. 113½ W.B.

2-dr. Sedan	1,025	4-dr. Sedan	1,125
Coupe	1,025	Con. Roadster	1,125
Sport Coupe	1,095	Pat. Sedan	1,190
Phaeton	1,095		

OLDSMOBILE—6-cyl. 113½ W. B. (5 Wire Wheel Equipment)

2-dr. Sedan	950	4-dr. Sedan	1,050
Coupe	950	Con. Roadster	1,050
Sport Coupe	1,020	Pat. Sedan	1,115
Phaeton	1,020		

PACKARD—726. Standard 8. 127½ W. B.

5 Sedan	2,685		

PACKARD—733. Standard 8. 134½ W. B.

2 Runabout	2,025	5 Coupe	2,275
4 Phaeton	2,025	5 Club Sedan	2,275
7 Touring	2,125	4 Spt. Phaeton	2,325
2 Coupe	2,125	7 Sedan	2,385
2 Con. Coupe	2,150	7 Sedan Limou	2,485

PACKARD—740. Custom 8. 140½ W. B.

4 Phaeton	3,190	5 Sedan	3,585
2-4 Roadster	3,190	5 Coupe	3,650
2-4 Coupe	3,295	5 Club Sedan	3,750
7 Touring	3,325	7 Sedan	3,785
2-4 Con. Coupe	3,350	7 Sedan Limous	3,885
4 Spt. Phaeton	3,490		

PACKARD—Speedster. 134 W. B.

4 Phaeton	5,200	4 Victoria	6,000
4 Runabout	5,200	5 Sedan	6,000

PACKARD—Individual Custom. 145½ W.B.

2 4-dr. Conv. Coupe (Derham)	6,334	6 Spt. Cabriolet (Brewster)	7,154
4 Conv. Victoria (Dietrich)	6,414	6 Spt. Limousine (Brewster)	7,159
4 Conv. Victoria (Waterhouse)	6,514	6 Spt. Sedan Limo. (Brewster)	7,334
4 Conv. Sedan (Dietrich)	6,694	7 Laudaulet (Le Baron)	7,339
6 Cabriolet (Le Baron)	6,784	6 Spt. Landaulet (Brewster)	7,494
6 Sedan Limou. (Le Baron)	6,859	6 Spt. Cabriolet (Le Baron)	9,174
4 Conv. Sedan (Brewster)	6,904	7 Cabriolet (Rollston)	9,849
6 Sedan Limou. (Le Baron)	6,954	6 Cabriolet (Rollston)	9,984
7 Cabriolet (Le Baron)	6,954	7 Cabriolet (Rollston)	10,049
6 Landaulet (Le Baron)	7,889		

PEERLESS—6-cyl. "61." 116 W. B.

2 Roadster	995	4 Victoria	1,145
2 Coupe	1,095	5 Sedan	1,195

PEERLESS—Standard 8. 118 W. B.

5 Sedan	1,495	5 Brougham	1,545
2 Coupe (R.S.)	2,795	2 Cabriolet (RS)	1,595
5 Club Sedan	1,545		

PEERLESS—Custom 8. 138 W. B.

5 Sedan	2,795	5 Brougham	2,845
2 Coupe (R.S.)	2,705	7 Sedan	2,945
5 Club Sedan	2,845	7 Limousine	3,145

PEERLESS—Master 8. 125 W. B.

5 Sedan	1,995	5 Brougham	2,045
2 Coupe (R.S.)	1,995	2 Cabriolet	2,005
5 Club Sedan	2,045		

PIERCE-ARROW—Group A. 8-cyl. 144 W.B.

7 Sedan	4,485	En. Dr. Lim.	4,685

PIERCE-ARROW—Group B. 8-cyl. 134 W.B.

Roadster	3,125	Con. Coupe	3,350
Touring	3,125	4 Spt. Phaeton	3,425

PIERCE-ARROW—Group B. 8-cyl. 139 W.B.

Vic. Coupe	3,475	7 Sedan	3,625
5 Sedan	3,495	Club Berline	3,695
Club Sedan	3,495	En. Dr. Lim.	3,825

PIERCE-ARROW—Group C. 8-cyl. 132 W.B.

Club Brougham	2,695	5 Sedan	2,875
Coupe	2,865		

PLYMOUTH—4-cyl.

Standard Coupe	590	2-4 Coupe (R. S.)	625
2 4-dr. Roadster (R. S.)	610	5 4-dr. Sedan	625
		Con. Coupe	695
5 Phaeton	625		

PONTIAC—6-cyl. 116 W. B.

Coupe	745	4-dr. Sedan	825
Roadster	765	Sport Coupe	825
2-dr. Sedan	775	Custom Sedan	875
Phaeton	795		

REO—Model 15. 6-cyl. 115 W. B.

Business Coupe	1,175	Spt. Bus. Coupe	1,250
Phaeton	1,195	Spt. Phaeton	1,270
Coupe (R. S.)	1,195	Spt. Coupe (RS)	1,270
Stand. Sedan	1,295	Sport Sedan	1,370

MERCHANDISING ACCESSORIES EQUIPMENT **WHOLESALE** DISTRIBUTION SHOP EQUIPMENT REPLACEMENTS

AMERICAN BOSCH NAMES JOBBERS

Appointments Include Car Radio Dealers And Stations

NEW YORK, May 28.—The American Bosch Magneto Corporation announces the following automotive appointments from May 17 to May 24, inclusive:

Service stations: Automotive Electric Company, Perryton, Tex.; Deitrich & Green, Vancouver, Wash.; Eisemann Magneto Service, Tacoma, Wash.

Foreign service station: Beattie Auto Electric, Ltd., Winnipeg, Manitoba, Canada.

Automotive wholesalers: L. L. Ensworth & Son, 212 State St., Hartford, Conn.; Ticonderoga Auto Supply, Ticonderoga, N. Y.; Borras Auto Supply Company, Corner Alcaniz and Governor Streets, Pensacola, Fla.; Southern Auto Supply, 613 Broad St., Chattanooga, Tenn.; Charles B. Scott Company, 119 Franklin Ave., Scranton, Pa.; M. H. A. Auto Supply, 663 Bay St., Stapleton, S. I., N. Y.

Replacement parts wholesalers: Fred W. Barth, Inc., 357 Mill St., Poughkeepsie, N. Y.; Lyons Auto Parts, 109 South Main St., Chambersburg, Pa.

Bosch motor car radio wholesalers: R. T. Clapp Company, 412 West Magnolia Ave., Knoxville, Tenn; Electric Power Maintenance Company, 1101 Monroe St., Toledo; Northern Battery Electric Company, 1316 Nicollett Ave., Minneapolis.

Bosch motor car radio dealers: John F. Watson, Two Rivers, Wis.; Consolidated Radio Service, 29 Sewarc Ave., Detroit; Jay Begtrup, 3470 Hudson Boulevard, Jersey City, N. J.

Bosch motor car radio service stations: Ignition and Electric Service, 1025 Main St., Peekskill, N. Y.; Jersey City Storage Battery, 2381 Hudson Boulevard, Jersey City, N. J.; Hackensack Magneto and Battery, 307 Main St., Hackensack, N. J.; Wheeler Battery Service, 26 South 6th St., Vincennes, Ind.; Ex-Cell Battery Works, 1446 South Wabash Ave., Chicago; Motor Car Radio Company, 8931 South Ashland Ave., Chicago; Auto Electric Service, 110 North Broadway, New Ulm, Minn.; Rickmeier-Fedler Electric Company, Sheboygan, Wis.

Gibson Co. Leads Wholesalers in M. E. A. Campaign

New York, May 28.—The Gibson Company, Indianapolis wholesaler, is leading the country in the number of dealer franchises sold in the Motor and Equipment Association's "Care Will Save Your Car" national advertising campaign, according to B. W. Ruark, M. E. A. sales development manager.

The Indianapolis house, and its branches, had enlisted 104 dealers in the preventive maintenance movement up to May 15. A. H. Webber, general sales manager, has been an enthusiastic backer of the program which provides automotive retailers with complete merchandising materials to tie in locally with the M. E. A.'s national advertising copy.

"I see in this campaign an opportunity for jobber members of our association to provide a distinctive service to their dealer customers," Mr. Webber said. "I believe that concerted efforts of the manufacturers, jobbers, and dealers to impress upon car owners the value of taking their cars in for regular inspection will definitely stimulate the maintenance business."

SAYER, HAY & CO. NEW JOBBING FIRM

Philadelphia, May 28.—R. S. Sayer, Jr., distributor of automotive specialties, and R. W. Hay have formed a new company, to be known as Sayer, Hay & Company, which will take over, on June 1, the Fisk tire master dealership business of Martin & O'Rourke, Inc., 1420-1428 Melon St. For the next thirty days business will be continued, at Mr. Sayer's plant, 1522 Fairmont Ave., at the end of which time the new company will remove to the location on Melon Street housing the tire company.

Mr. Hay will manage the tire department of the new concern, whose territory will include eastern Pennsylvania, southern New Jersey and Wilmington, Del. Mr. Sayer for years has distributed automotive specialties on Fairmont Avenue, formerly at 1501 and more recently at 1522.

Editor's Column

COL. MALCOLM C. RORTY, vice-president of the International Telephone and Telegraph Corporation, speaking before the annual spring convention of the American Management Association recently, declared that the executive managements of nine out of ten large-scale businesses are clouded with politics, and that periodically one great corporation after another is wrecked or gets into serious difficulties because of disruption in the higher ranges of the operating staff.

"If an organization is good at the top," he continued, "it is quite certain to be good throughout all its ranks, although there are instances where an organization may violate all the rules of good management at the top and still show a skilled handling of the lower ranges of its personnel.

"The greatest of management problems is that of safeguarding and developing the human element in the upper ranges of corporation organizations. The whole progress of civilization and the intimate welfare of the lowest worker depend upon conserving and developing the qualities of leadership. The final justification of management, as a science, will come when it adds to its economic usefulness a proven contribution to the development of human individuality and character."

Col. Rorty gave the following ten rules of good organization, some of which big jobbing concerns could adopt to their advantage:

1. Definite and clean-cut responsibilities should be assigned to each executive.
2. Responsibility should always be coupled with corresponding authority.
3. No change should be made in the scope of responsibilities of a position with a definite understanding to that effect on the part of all persons concerned.
4. No officer or employee occupying a single position in the organization should be subject to definite orders from more than one source.
5. Orders should never be given to subordinates over the head of a responsible officer. Rather than do this the officer in question should be supplanted.
6. Criticisms of subordinates should, whenever possible, be made privately, and in no case should a subordinate be criticized in the presence of officers or employees of equal or lower rank.
7. No disputes or difference between officers or employees as to authority or responsibilities should be considered too trivial for prompt and careful adjudication.
8. Promotions, wage changes and disciplinary action should always be approved by the officer immediately superior to the one directly responsible.
9. No officer or employee should ever be required or expected to be at the same time an assistant to and critic of another.
10. Any officer whose work is subject to regular inspection should, whenever practicable, receive the assistance and facilities necessary to enable him to maintain an independent check of the quality of his work.

NEW FIRESTONE UNIT

Camden, N. J., May 28.—The Firestone Service Stores, Inc., has opened a new one-stop station at Federal Street and Wright Avenue, this city. The concern will sell Firestone tires, batteries, brake lining and is offering tire repairing, battery repairing and charging, brake testing, adjusting and relining, lubrication, car washing and road service.

PERRY MOTOR SUPPLY AWARDS BEST TALKERS

East Orange, N. J., May 28.—Edward Murphy was the winner of a prize of $10 given by Edward V. Perry of the Perry Motor Supply Company of Central Avenue, East Orange, for the best sales talk and demonstration of Goodyear tires at a sales meeting held by the Goodyear Tire and Rubber Company for the Perry Company. Every employee of the company was required to demonstrate and deliver a sales talk. C. L. Baer, branch manager of the Newark offices of the Goodyear Company, acted as judge. Hiram Q. Morrison, sales representative for the Orange territory, was present.

JOBBER HOLDS DEALER SESSION IN TENNESSEE

Nashville, Tenn., May 28. — An event of interest sponsored by Buford Brothers, wholesale automotive accessory firm, 154 Second Ave. North, took place at Murfreesboro. M. D. Graham of the National Automobile Dealers' Association spoke. He emphasized the idea that the future of the automobile dealer is to be found in the merchandising of equipment and service. The change in the trend of the automobile industry is from the sale of new cars to the sale of supplies and service. Lack of dealer organization was mentioned as an obstacle.

FOWLER LAMP & MFG. CO. HAS NEW CHICAGO HOME

Chicago, May 28.—Harry N. Fowler, president, announces removal of the Fowler Lamp and Manufacturing Company from 61 East 24th St., where it has been located for twenty years, to 121 East 24th St. The new quarters have been completely remodeled, including installation of a modern electroplating and automobile lamp repair plant prepared to do chromium, nickel, silver and copper plating. Mr. Fowler has been on Chicago's automobile row for 30 years.

Crude Rubber Prices at Low Level; Supplies High

NEW YORK, May 28.—Crude rubber in the New York market is currently selling close to the lowest prices in history, with May delivery slightly under 14 cents a pound. This is below the cost of producing and laying down a pound of rubber in New York, this cost being estimated at around 17 cents.

This means that at current prices, the average producer is losing about 2½ cents on each pound sold in this city.

Although the effects of the Anglo-Dutch rubber tapping holiday, which is in effect in the current month, will not be fully known until the first of July, results, when known, will serve as a good index of the degree of co-operation to be expected from any further scheme for the restriction of crude rubber production in order to reduce to the obvious oversupply now on hand.

In itself, the cessation of tapping during May, even if followed to the letter, will do very little toward ameliorating the present depressed price situation. It is estimated that the tapping holiday during the current month will, at the best, keep less than 40,000 tons of crude off the market.

The total visible supply of crude rubber at the close of April was 420,000 tons. This was a gain of 5,000 tons over the 415,000 tons estimated at the end of March and compared with 410,000 at the end of February, 388,000 tons at the end of January, and 371,000 tons on December 31, 1929. There were 284,000 tons on hand at the close of 1928, 299,000 tons at the end of 1927 and 256,000 tons at the close of 1926.

The estimated consumption of crude rubber by the world in 1930 is 840,000 tons. Thus it is seen that half of the total consumption for 1930 was visible at the close of April.

REMINGTON RAND

Remington Rand, Inc., for the year ended March 31, 1930, reported net profit of $6,040,554 after depreciation, interest and Federal taxes, against $2,927,766 in the preceding year.

AUTOCAR PFD. DIVIDEND

Autocar Company declared regular quarterly dividend of $2 on the preferred, payable June 15 to stock of record June 5.

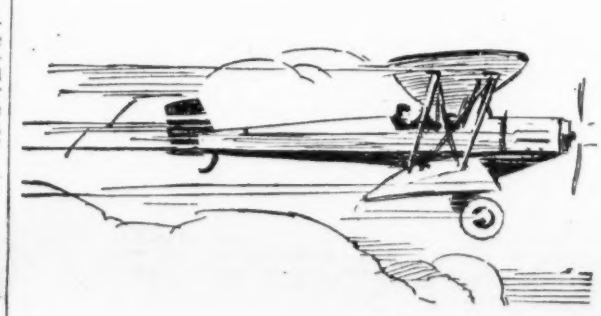
CRUDE OIL OUTPUT OFF FOR WEEK OF MAY 24

New York, May 28.—The American Petroleum Institute estimates that the daily average gross crude oil production in the United States for the week ended May 24 was 2,579,500 barrels, as compared with 2,607,900 barrels for the preceding week, a decrease of 28,400 barrels.

Imports of petroleum (crude and refined oils) at the principal United States ports for the week ended May 24 totaled 2,149,000 barrels, a daily average of 307,000 barrels, compared with 2,253,000 barrels, a daily average of 321,857 barrels for the week ended May 17, and a daily average of 296,000 barrels for the four weeks ended May 24.

CHARTER SUPPLY CONCERN

Newark, N. J., May 28—The Capitol Auto Service Stations, Inc., to deal in automotive supplies in Newark and capitalized at $100,000, has been formed by Peter Smith, William Akelaitis and Frank Elsieka, Newark.



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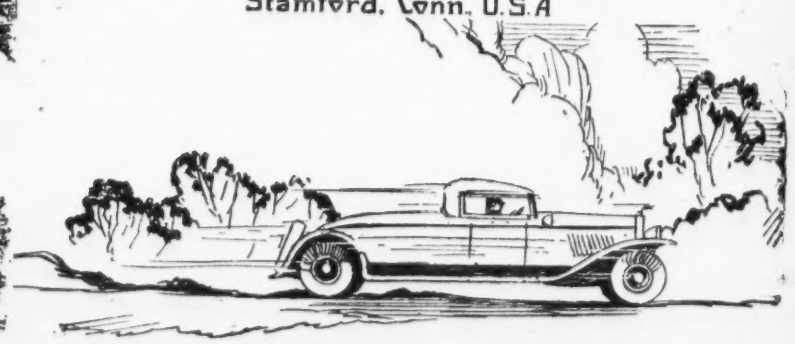


Comments, Criticism of Passenger Car Gearsets

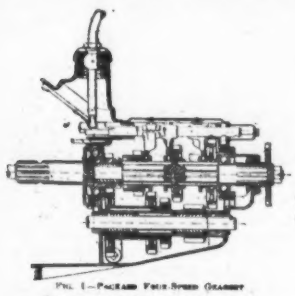


FIG. 1—PACKARD FOUR-SPEED GEARSET
Only straight bevel gears are used in this set

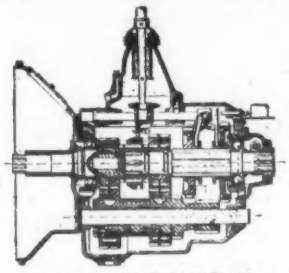


FIG. 2—PIERCE-ARROW FOUR-SPEED GEARSET
Herringbone gears are employed for constant mesh and third-speed trains

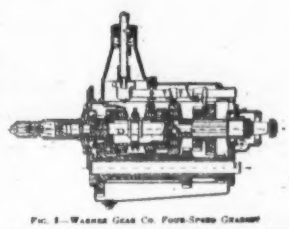


FIG. 3—WARNER GEAR CO. FOUR-SPEED GEARSET
This design as used in the Marmon Model and on several other makes of car has internal gears and two reductions in the constant-mesh type

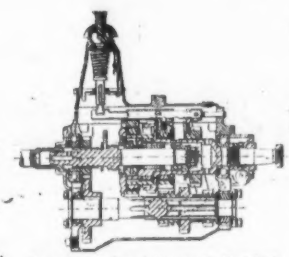


FIG. 4—DETROIT GEAR & MACHINE CO. FOUR-SPEED INTERNAL-GEARSET AS USED IN FRANKLIN CARS

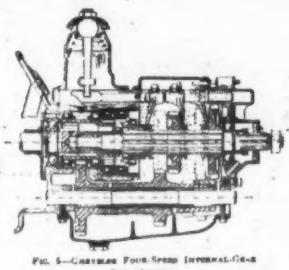


FIG. 5—CADILLAC FOUR-SPEED INTERNAL-GEAR TRANSMISSION
This design has two reductions in the constant-mesh trains

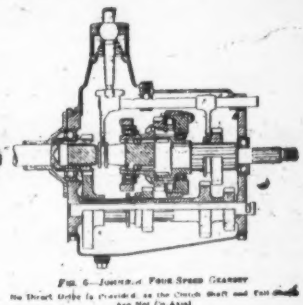


FIG. 6—JORDAN FOUR-SPEED GEARSET
No direct drive is provided, as the clutch shaft and fast gears are not co-axial

THE following paper on "Comments and Criticism of American Passenger Car Gear-Sets," presented at the summer meeting of the Society of Automotive Engineers at French Lick Springs, Ind., on Monday, by Herbert Chase, American Machinist, and touched on briefly in the Automotive Daily News, is given complete in this issue:—

AUTOMOTIVE engineers apparently are agreed that in at least two respects gearset design is in need of improvement; namely, those which affect ease of shifting and those controlling noise in operation.

Most major changes in the design of gearsets within recent years have been directed, at least in part, toward these ends, but other changes of a rather more radical nature and about which a great diversity of opinion exists have entered. They have complicated the whole situation, because they have distinct bearing upon the type and size of engine to be employed, the rear axle gear ratio, the design of other units, such as the clutch, propeller shaft and universal joints; the weight of the car and, last but not least, upon salability of the product. I refer to the number of speed changes available.

A trend toward four-speed gearsets has developed, but whether this change has been dictated more by expediency to meet a particular sales situation than by purely engineering considerations is a moot question.

Undoubtedly part of the automobile-buying public believes, or can be led to believe, that four speeds necessarily are better than three, just as many persons have come to rate cars roughly in proportion to the number of cylinders the engine has. It may be good business to take advantage of this situation, but my intention here is to discuss the purely engineering aspects of the subject.

At the moment there are at least five general classes of car on the market:—

(1) Cars combining a relatively large but comparatively low-speed engine with a three-speed gearset and a small axle reduction.

(2) Cars incorporating a moderately small, relatively high speed engine, a small axle reduction and a four-speed gearset intended to keep the engine running at low speed most of the time.

(3) Cars incorporating a moderately small, relatively high-speed engine, a three-speed gearset and a rather large axle reduction.

(4) Cars having a medium size engine of fairly high speed, a four-speed gearset and a rather large axle reduction.

(5) Cars combining a large, relatively high speed engine, a three-speed gearset and a rather large axle reduction.

Other classifications doubtless could be added, but this variety is great enough to indicate that a marked difference of opinion exists among engineers as to the best combination of the variables mentioned. The power-weight ratio of the complete car is a factor of importance in determining the combination selected, but it is not always the controlling factor.

ADVANTAGES CLAIMED FOR FOUR-SPEED GEARSETS

Since the four-speed gearset has made a place for itself in fifteen or more makes of chassis and, in certain cases, on several models of the same make, its construction is deserving of comment and the advantages claimed for it demand analysis. Its disadvantages also should be weighed.

All four-speed types in regular use on American cars drive direct only on fourth speed; none are overgeared. In all cases efforts have been made to assure a quiet third speed. Four makers (the Warner Gear Company, the Detroit Gear and Machine Company, the Chrysler Corporation and the Warner Corporation) aim to achieve this relatively quiet operation by the use of internal-gear trains. The Pierce-Arrow Motor Car Company employs herringbone gears in constant mesh and the Packard Motor Car Company uses spur gears that are carefully ground and fitted. Of these makes all except the Packard have certain design characteristics intended to make possible, and presumably achieving, an easier shift from third to high speed and vice versa than is obtained in shifting from second to high in conventional three-speed gearsets.

These advantages of easier shifting and quieter operation in next-to-top speed appear to have been attained, but some engineers of standing still have to be convinced that operation is any less noisy than that of well-made conventional types. Quiet operation and easy shifting can be and are realized in some three-speed gearsets to the same extent as in the four-speed variety; they are not advantages peculiar to the four-speed variety, although more frequently made available in that type at present.

Other advantages said to be realized by American four-speed gear sets now in use include:

(1) Lower engine speeds, with consequent decrease in engine noise and vibration, especially at high car speeds, and less fatigue in driving.

(2) Fewer engine revolutions per mile, with resulting decrease in engine wear and friction losses.

(3) A smaller reduction in rear axle gears, which consequently are smaller, lighter, cheaper and quieter.

(4) Lower propeller shaft speeds, resulting in less whip and noise, or permitting the use of lighter and less expensive parts.

(5) Improved fuel economy, resulting from a better power factor and lower oil consumption.

(6) Ability to accelerate more rapidly without excessive gear noise in the next-to-top speed.

(7) Shorter steps between gears and a lower low gear for emergency use.

(8) General excellent performance in third speed in traffic.

This is a rather imposing list of advantages, but can they all be realized in practice, and, if so, what penalty is paid? Or can they be obtained with some simpler form of construction? An analysis should bring us to the crux of the matter.

SACRIFICE MUST BE MADE FOR ACCELERATION

With an engine of given size and small reduction in rear-axle gears, a lower average engine-speed can be realized with a four-speed gearset, engine noise and vibration can be decreased thereby, and it is fair to assume that less fatigue will result on this score. There also will be a consequent saving in engine wear, reduced friction losses and higher fuel and oil economy.

These are very real advantages, but to obtain them a definite sacrifice in what is loosely termed "performance" in top speed is necessary. The car no longer has the same ability for rapid acceleration unless a shift is made to the quiet third speed. If the driver is willing to make the shift, well and good, but it must be made as often as the car is accelerated if the rapid rate of acceleration to which American motorists are accustomed is to be realized.

Is the average driver willing to make this sacrifice? Unless he is, his car will prove somewhat logy as compared with corresponding cars having greater axle reductions. As I see it, the fate of the present type of four-speed gearsets hinges largely upon the answer to this question. Apparently the answer has been given to the satisfaction of at least one car manufacturer, for, starting with small reduction axles when the four-speed gearset first was applied, this company soon went back to the larger reduction but retains four speeds. Other companies continue to apply axle gears giving a large reduction.

Engineers with another viewpoint say in effect, "Get both the rapid acceleration and the advantages of a low-speed engine and small axle-reduction, without going to four-speed gearsets, by the simple expedient of using a larger engine." This has some obvious advantages in the way of simplicity, but in the large-car group it is presumed to involve the use of a larger and heavier engine and driving parts and, consequently, a heavier and more expensive car; also, possibly, an increase in the number of cylinders if reciprocating parts are to remain as light as is necessary for the degree of smoothness desired.

AXLE RATIOS WITH FOUR-SPEED GEARSETS

It is a significant fact, however, that both the Ford and Chevrolet companies follow this practice and succeed in producing cars of light weight and low cost. Another example of similar practice, but applied to a larger chassis, is the Studebaker Commander Six, which uses a 3.7:1 rear axle ratio, yet is reported to perform well on hills and during acceleration. This car has a 348.3 cubic inch engine said to develop a maximum of 75 b-hp. at 3,000 r. p. m. The only other American cars I find listed with standard axle ratios below 3.85:1 are the Dodge Senior Six (3.77), Chrysler 77 (3.82), Chrysler Imperial (3.77), Durant 6-17 (3.72) and Graham Custom Eight (3.64). All of these (except the Chrysler Imperial) have four-speed gear sets.

The standard gear ratios listed for all American cars using four-speed gearsets are given in Table 1, from which it appears that the average reduction is not greatly different from that on most cars with three-speed gearsets. One natural inference to be drawn from this table is that, despite apparent possession of advantages (1 to 5) given in the preceding list, the disadvantage of more frequent gear shifting required with a four-speed gear shift and small axle reductions has led those who use the four-speed gearset to sacrifice these advantages and employ almost if not quite as large reductions as commonly are used with three-speed gearsets.

Two of the remaining advantages claimed (6 and 8), are not admitted by some engineers. They do not deny that the four-speed gearset does permit of more rapid acceleration in third speed than the usual three-speed arrangement gives in top speed, but some say that, as regards the noise under these circumstances and the general performance in traffic, there is little if any improvement over conventional three-speed arrangements. Others profess to find considerable improvement in both directions. As usual, where precise measurements are difficult or impossible, a difference of opinion is more than likely.

Advantage (7), shorter steps between gears and lower low gear for emergency use is conceded, but carries much too little weight to be of substantial moment if the other advantages claimed are not conceded. Ordinarily, the conventional low gear is quite low enough for all practical purposes, and the steps are not so far apart as to warrant the added complication and more frequent shifting likely to be associated with four-speed gearsets.

COMPLEXITY A DRAWBACK

On the negative side of the argument certainly must be included the added complexity of the four-speed gearset itself. No more than a glance at the accompanying designs of three-speed and four-speed transmissions is needed to determine which type is the simpler and the easier to manufacture. The four-speed sets, and in particular those using internal gears, present some difficult and costly operations in manufacturing, and also in service, when repairs or replacements are required. Some problems of the same or a similar character must be faced and solved if quiet operation on other than direct speed is to be obtained in three-speed sets, but, if such a quiet set is compared with a four-speed internal gear type, the latter is found to be noticeably more complicated.

A criticism of the four-speed gearset that seems to me to be fair, although somewhat severe, is contained in the following summary by Delmar G. Roos, chief engineer of the Studebaker Corporation, contained in a paper he presented before the Indiana section of the society on February 14, 1929:

"Any one manufacturing the ordinary three-speed type of gearbox and trying to make a good job of it knows that he has his hands full. Any one who examines the best designs of the four-speed gearbox with the internal third gear knows that to put a transmission of this kind in the plant and manufacture it with any degree of uniformity is certainly going to be one of the most difficult problems that has yet been put into an automobile factory.

"It is not quite clear to the disinterested observer just what people expect to get from the four-speed gearbox. If the engine size is adequate to permit the use of a rear axle of 3.7 to 3.3:1 ratio, such as Studebaker used in its Commander, with excellent performance on hills, straightaways and acceleration, it seems that very little could be hoped for from putting a four-speed gearbox in such a car. On the other hand, if the engine were inadequate so that the rear-axle ratio, to give satisfactory performance on hills, would have to be, say 4.5 or 4.8:1, we can see that, by putting a four-speed gearbox in, we might get an axle that was 4:1, or even 3.9:1, on high and having a ratio in the third speed of perhaps 5.5:1.

"The question boils down to this: Can the problem be better and more simply met by an engine of larger displacement, economically designed as to weight, rather than an engine of intermediate or small displacement in proportion to the weight of the car?

"Our experience so far in driving cars equipped with these gear boxes, particularly in traffic in metropolitan districts and in mountainous districts, has left us at a loss to find that it aroused any particular enthusiasm. They are invariably noisier in third speed than any gear box that our customers have been willing to accept. Our opinion is that the whole issue is a false one which has been raised in a desperate effort to secure attention, and that, unfortunately, it may take hold simply as a fad; but we do not believe it has any sound foundation to rest on, and, in the long run, the public is going to pay, just as it always does, for the experimenting of the engineers."

REDUCTION OF ENGINE SPEED

One justification often advanced for the four-speed gearset is that it keeps the engine at a speed that is lower, more comfortable and much less destructive when the car is traveling at high speed than does the three-speed set. This is true when a small reduction in axle gears is used, but not otherwise. Moreover, it should be emphasized that relatively few car users do any large part of their driving at speeds above

(Continued on page 10)

TABLE 1—REAR-AXLE RATIOS OF AMERICAN CARS WITH FOUR-SPEED GEARSETS

Car Make and Model	Piston Displacement of Engine, Cu. In.	Maximum B-Hp. at Specified Speed	Make of Gearset	Standard Rear-Axle Gear-Ratio
Black Hawk L8	241.5	85 at 3200	Detroit	4.5
Black Hawk L8	268.5	88 at 3100	Detroit	4.5
Chrysler 70	268.4	87 at 3200	Own	4.1
Chrysler 77	268.4	87 at 3200	Own	3.82
Dodge Senior Six	241.4	61 at 3400	Warner Gear	3.77
Durant 6/17	248	70 at 3000	Warner Corp.	3.72
Elcar 95-96	246.7	90 at 3000	Warner Gear	4.9
Elcar 130-140	322.9	140 at 3300	Warner Gear	—
Franklin 145	274	95 at 3100	Detroit	4.54
Franklin 147	274	95 at 3100	Detroit	4.25
Gardner 136	185	70 at 3500	Warner Gear	4.45
Graham Special Six	224	76 at 3400	Warner Gear	3.91
Graham Special Eight	298	96 at 3400	Warner Gear	3.9
Graham Custom Eight (127-in. wheel base)	322	120 at 3200	Warner Gear	3.64
Graham Custom Eight (137-in. wheel base)	322	120 at 3200	Warner Gear	3.9
Kissel 8-95	246	95 at 3400	Warner Gear	5.1
Kissel 8-126	298	126 at 3600	Warner Gear	4.8
Jordan Z Speedway	322.2	114 at 3200	Warner Gear	—
Marmon Big Eight	315.2	125 at 3400	Warner Gear	4.81
Packard 726	320	90 at 3200	Own	4.37
Packard 733	320	90 at 3200	Own	4.67
Packard 740	384.8	106 at 3200	Own	4.37
Packard 745	384.8	106 at 3200	Own	4.37
Peerless Master Eight	322	120 at 3200	Warner Gear	4.45
Peerless Custom Eight	322	120 at 3200	Warner Gear	4.45
Pierce-Arrow 132	340	115 at 3000	Own	4.42
Pierce-Arrow 125-139	366	125 at 3000	Own	4.08
Pierce-Arrow 126	385	132 at 3000	Own	4.42
Stutz Series M	322	113 at 3300	Detroit	4.5
Windsor 8-92	268.8	86 at 3200	Warner Gear	3.9

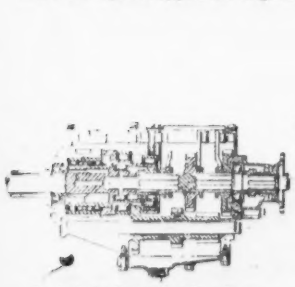


FIG. 7—LATEST DURANT FOUR-SPEED DESIGN
Three reductions are provided in the constant-mesh gear-train

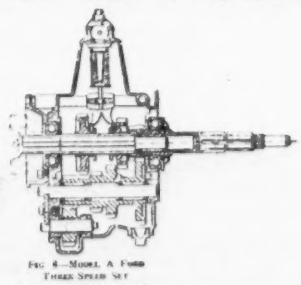


FIG. 8—MODEL A FORD THREE-SPEED SET
This is a good example of a design for low manufacturing cost

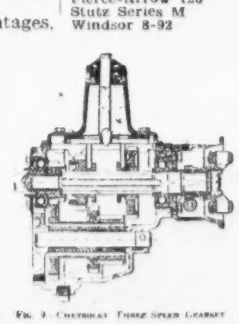


FIG. 9—CHEVROLET THREE-SPEED GEARSET
A good example of a compact conventional design of low production cost

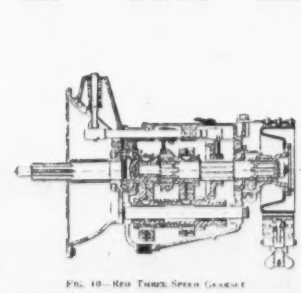


FIG. 10—REO THREE-SPEED GEARSET
Herringbone gears are used for constant mesh and second-speed gear trains for quiet operation

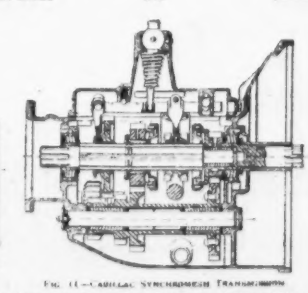


FIG. 11—CADILLAC SYNCHROMESH TRANSMISSION
Friction clutches are used to facilitate shifting into second and top speeds

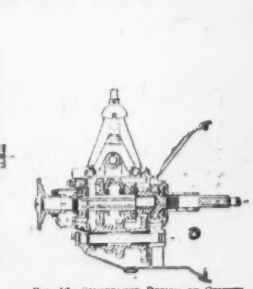


FIG. 12—STUDEBAKER DESIGN OF CONVENTIONAL THREE-SPEED GEARSET

Buick Marquette

GREATER VALUE
and
WIDER PRICE RANGE

Win and Hold *More* Owners *Longer*

Buick-Marquette dealers sell more Buicks each year to Buick owners alone than the total annual production of any other car priced above $1200.

Repeat orders are profit orders. Buick-Marquette dealers get more of this type of business than any other automobile dealer. Four out of every five of the great army of 1,500,000 Buick owners buy Buicks again and again.

Once owners experience Buick-Marquette performance, dependability and value they stay in the Buick family. And the wide Buick-Marquette price range—$990 to $2070, f. o. b. factory—helps dealers to hold more owners for a longer period of time.

Owners know that the manufacturing economies resulting from Buick's consistent 2 to 1 sales leadership and the record $26,000,000 demand for Marquette result in extra value. Dealers know that this steady nationwide preference insures steady, certain success.

Get the complete Buick-Marquette story. There may be a franchise open in your community. Write or wire—today.

BUICK MOTOR COMPANY, FLINT, MICHIGAN

Division of General Motors Corporation

Canadian Factories
McLaughlin-Buick, Oshawa, Ont.

Builders of
Buick and Marquette Motor Cars

WHEN BETTER AUTOMOBILES ARE BUILT . . . BUICK WILL BUILD THEM

Comments, Criticism of Passenger Car Gearsets

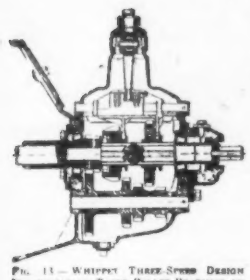


FIG. 13—WHIPPET THREE-SPEED DESIGN INCORPORATING TAPER ROLLER-BEARINGS ON THE MAIN SHAFT

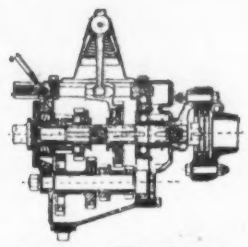


FIG. 14—NASH THREE-SPEED GEARSET
A Fabric-Disc Universal Joint Tends To Reduce the "Telegraphing" of Vibration and Noise from Rear Axle to the Gearset. One of the Mainshaft Bearings is a Straight Roller Type

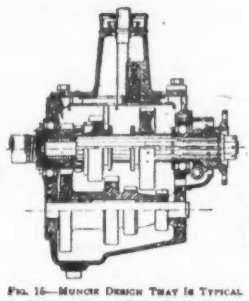
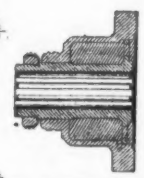


FIG. 15—MUNCIE DESIGN THAT IS TYPICAL OF GENERAL MOTORS THREE-SPEED-GEARSET PRACTICE



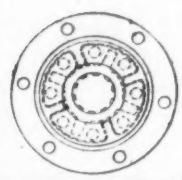


FIG. 16—OAKLAND RUBBER-CUSHIONED HUB ASSEMBLY FOR DRIVING PROPELLER-SHAFT

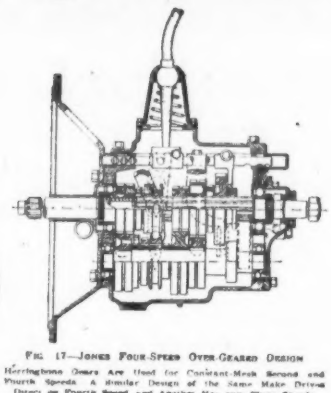


FIG. 17—JONES FOUR-SPEED OVER-GEARED DESIGN
Herringbone Gears Are Used for Constant-Mesh Second and Fourth Speeds. A Similar Design of the Same Make Drives Direct on Fourth Speed and Auxiliary Has only Three Speeds

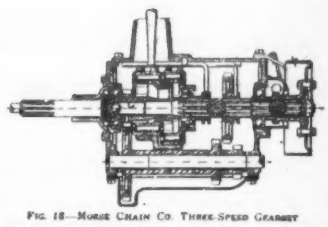


FIG. 18—MORSE CHAIN CO. THREE-SPEED GEARSET
This Design Has Internal Gears. Similar Designs by the Same Company Have Four Speeds

(Continued from Page 8)

50 m. p. h., even though there is perhaps a tendency in that direction in localities where excellent roads and long level straightways abound. Those who do drive much at high speeds may perhaps choose the car with four speeds and small gear reduction and put up with extra gear shifting under some conditions. I venture to say, however, that fully 95 per cent. of American drivers would not choose axle ratios much below 4:1 if they understood the alternative and what it involves.

In the foregoing the references have been confined to four-speed gearsets driving direct in high. A good case might be made for overgearing in fourth speed, although that, too, presents some disadvantages. I shall not attempt to go into that question here, but it may be said, in passing, that a really quiet overgeared fourth speed intended only for use in making high road speeds, combined with axle-gear reductions that are not too small, would tend to keep the engine at more acceptable speeds when the car is driven at high speed. This need not involve such frequent gear changing as the direct fourth, with axle reductions of about 3.8:1 and engines of moderate power.

DIFFERENCES IN FOUR-SPEED GEARSET TYPES

So much for present-day four-speed gearsets as a type. Differences between types may be discussed along with those of three-speed types, for, as far as details of design are concerned, many of the same factors are involved, assuming that the aim in general is to produce quiet operation, together with easy shifting.

On the score of simplicity, the Packard spur gearset, shown in Fig. 1, seems to lead the four-speed types, for it has no more bearings and only one more spur gear than conventional three-speed types, which it resembles closely in other respects.

Next in order is the Pierce-Arrow gearset, illustrated in Fig. 2, which uses herringbone gears for the constant mesh and third-speed pairs. The number and arrangement of gears and bearings in this gearset follow closely the design of three-speed sets, except that the extra speed requires one additional gear on the main shaft, a pair of roller bearings for mounting this gear and a toothed clutch for engaging it with the main shaft. The herringbone gears are cut in two separate blanks, afterward riveted together. Those in the constant-mesh pair are all 12-pitch, but those in the third-speed pair are 12-pitch for forward pair of blanks and 10-pitch for the rearward pair, an arrangement intended to promote quiet operation by breaking up any synchronous hum. The slight additional complexity as compared with a straight four-speed spur gearset is offset by the quieter operation in third speed.

INTERNAL GEARS FOR QUIET THIRD SPEED

All of the other four-speed transmissions now standard on American passenger cars employ two pairs of internal gears to achieve whatever degree of quietness is attained in third speed. As I see it, the Warner Gear Company and the Detroit Gear and Machine Company designs (Figs. 3 and 4), are about equal in complexity, and decidedly more complex than the Packard and the Pierce-Arrow spur gear designs. Next in order, and only slightly more complex, is the Chrysler design (Fig. 5), followed by the early Durant as the most complex of all.

Possibly a little less complex than any of these four internal gear designs is the Johnson gearset, shown in Fig. 6, but not used as standard on any American passenger car, so far as I am aware. In this design, the tail shaft is not co-axial with the clutch shaft. It is offset a distance equal to the eccentricity of the internal gears and their spur pinions, so that the drive never is direct, but is through two pairs of internal-external gears in both third and fourth speeds. This is a disadvanatge that some may regard as more than offsetting any gain in simplicity.

Some of the seven four-speed gearsets referred to and illustrated herein have been described in papers presented before the society. The drawings reveal most of the essential particulars regarding the others. It is worthy of note, however, that the internal gear types require three or four more roller bearings than do the spur gear types, and, in addition, substitute for some of the spur gears internal gears cut on flanged or sleeve members that are much more expensive to make than ordinary spur gears and seemingly more expensive than the herringbone type. Then, too, more extra parts, such as positive tooth clutches, are required than in the spur gear type.

In the Chrysler design the constant mesh train involves three spur and one internal gear instead of two simple spur gears as in all other designs of the internal gear type except the Durant. While this complete train is loaded only in reverse, low and second speeds, none of which is much used, the extra gears turn constantly and cannot be expected to add to quietness of operation. The Chrysler gearset comprises a total of more than 100 parts and is far from being an easy unit to manufacture or assemble. For use in servicing it, no less than thirteen special tools are recommended, and the instructions for servicing fill a forty-page booklet.

Even more complex is the early Durant design. A drawing of a later and somewhat simpler Durant design is reproduced in Fig. 7. It, however, has more bearings than other makes. The earlier design has five roller and three ball bearings for supporting the gears and other parts composing the mainshaft assembly alone. The secondary shaft is splined and carries a pair of shiftable gears, as well as the keyed-on constant-mesh gear. It also drives a vane pump required for feeding lubricant to various parts. In this case the constant-mesh train alone involves three pairs of gears, so that the drive in low and second speeds is through four pairs of gears. All this is the price paid in efforts to obtain a quiet third speed. It is not difficult to see why engineers who have not been convinced of the superiority of four-speed gearsets say that the end does not justify the means.

ACHIEVEMENTS OF THREE-SPEED ADVOCATED

In fairness to those who favor four speeds, it is proper to inquire what the three-speed advocates have done toward achieving quieter operation, easier shifting and longer life of the car without undue sacrifice in general performance. Part of the answer has already been given in the discussion of rear axle gear ratios.

Both the Ford and Chevrolet cars have fairly large engines for the weight of the car and therefore have been able to use rather small reductions in rear-axle gears, thereby keeping the engine speed low without sacrificing good general performance. That their gearsets are simple in design is apparent from Figs. 8 and 9. Ease in shifting and the degree of quietness in operation are not greatly different from those of other cars in the low-price range. The point to be emphasized in their case, however, is that high engine speeds, which, as I see it, are largely responsible for bringing the four-speed gearset into the picture, are not essential if a sufficiently high power weight ratio can be obtained in some other way.

More needs to be done to reduce car weight without going to high-engine speeds. Chassis are now made stiff and heavy to accommodate a body that is made heavy to keep it stiff, for present-day bodies do not stand much flexing without becoming noisy or failing in some other respect. Then a heavier and more powerful engnie is required or its speed is boosted to keep the power-weight ratio high. The next step in this vicious cycle is a heavier and more complex gearset. If a start were made by building a body lighter and either redesigning it so that it could flex without injury or mounting it on the chassis frame which supports it so that road inequalities would not cause flexing, success in reversing the cycle might be attained. There is more in this suggestion than may appear on the surface. It is receiving serious thought in some circles and could be studied to advantage by every automobile engineer.

HERRINGBONE GEARS USED FOR QUIETNESS

Most three-speed gearsets fall short on the score of quietness in second speed, and, to some extent, in respect to ease in shifting by the inexpert driver, but some steps to remedy those shortcomings have been taken. In fact, the Reo Motor Car Company's use of herringbone gears for constant mesh and second speed trains antedates their use by Pierce-Arrow, although in the Reo installation shown in Fig. 10, no extra roller bearing is employed for mounting the second speed herringbone gear on the main shaft. This gear merely rides free on the main shaft until connected thereto by the positive clutch. This clutch is light and of small diameter, and consequently makes shifting relatively easy. Both pairs of herringbone gears remain in constant mesh and run idle in all except the second speed positions, which is not a serious disadvantage, but one that well might be avoided if a simple way of doing so could be found. In other respects this gearset seems to meet every requirement. Except for the herringbone gears it should cost but little if any more than conventional types. Incidentally, it has a separately cast bell housing, a feature that is incorporated in many modern gearsets and that is designed to reduce manufacturing cost. Lead base lubricants are recommended for use in this gearset.

Another three-speed gearset designed to combine quietness in intermediate gear and ease of shifting is the Warner Gear Company transmission used for a time on the smaller Franklin chassis. This is of the internal gear type, and is a virtual replica of the Warner company's four-speed design, except that one of the two spur gears on the primary shaft has been omitted and the unit shortened a corresponding amount. Although relative quietness and ease of shifting are said to be attained, the complexity of the design is not very much less than that of the company's four-speed unit.

SYNCHROMESH UNIT FOR QUIET SHIFTING

One other design in extensive use incorporates a device intended to facilitate shifting without gear clashing. This is the Syncromesh unit employed in Cadillac and La Salle cars and illustrated in Fig. 11. It has only straight spur gears arranged in approximately the conventional way, except that the intermediate-speed pair is in constant mesh. In consequence, the mainshaft gear of this pair is mounted loosely upon a bushing keyed to this shaft. When driving, this gear is connected to the shaft by splined coupling having external teeth that mesh with internal teeth cut on the inner surface of a sleeve made integral with the gear. The external surface of this projecting sleeve forms the inner member of a cone clutch. The outer member of this clutch is a steel drum with bronze lining, the drum having inwardly projecting spokes that engage with the splined shaft.

When a shift into intermediate speed is to be made, the two conical surfaces first are brought into engagement, causing the shaft and the coupling which it carries to rotate at the same speed as the gear about to be engaged. Further motion of the coupling brings its teeth, some of which are cut away to enable the coupling to pass between the spokes of the drum, into engagement with those inside the gear projection, thereby positively locking the gear to the shaft. This latter motion causes no clashing, since the teeth to be engaged are turning at the same speed. A precisely similar arrangement of clutch faces, drum and coupling is used for the shift into direct drive. Thus it is virtually impossible for even a novice driver to clash gears in shifting from second to top speed or vice versa under almost all conditions.

Extremely easy shifting is accomplished, but the mechanism for bringing it about involves a considerable number of extra parts, including those of a rather complex yoke arrangement which moves the clutch drums into engagement and then back into neutral position after the gears are engaged and before another shift can be made. The yoke mechanism includes a pair of oil plungers or dashpots arranged to automatically prevent excessively rapid shifting.

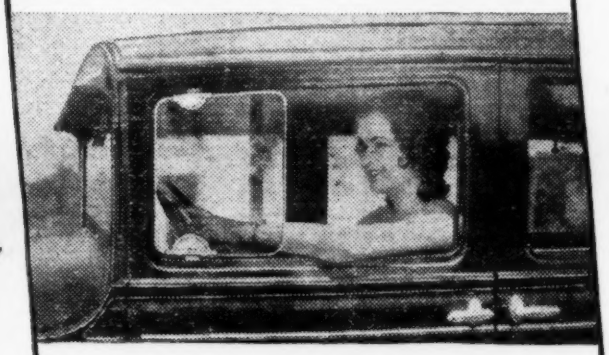
Aside from items already mentioned and the use of Hyatt roller-bearings on the main shaft, where ball-bearings ordinarily are employed, this gearset presents no noteworthy departures from conventional practice. Careful manufacture of the gearing is depended upon to assure the degree of quietness required. Reverse and low-speed gears are shifted in the usual way.

MEANS AVAILABLE FOR REDUCING NOISE

Other gearsets used on American passenger cars differ chiefly in details of construction. (See Figs. 12 to 15.) The tendency has been toward compact designs, partly to limit weight and cost and partly to reduce the distance between bearing centers, thereby making the shafts stiffer, decreasing deflection and helping to reduce noise in operation. Other items tending to reduce noise deserve mention. One is the mounting of the gear case on rubber supports, which help to prevent vibration from being transmitted to frame and body. A second is the use of rubber in the drive, between the gearset and axle, as in the rubber-hub coupling used on the tail shaft of the Oakland gearset, shown in Fig. 16. This hub is said to be very effective in reducing high-speed gear rattle and the "telegraphing" of axle noise from the rear axle to the gearset. It also

(Continued on page 11)

NO DRAFTS—NO DUST



PERFECT VENTILATION

Frequently motorists sacrifice ventilation for immediate comfort in storms and cold weather. Windows are closed with resultant headaches—danger from poor vision, not hearing or giving signals.

The position of Dole Draft Deflectors in the door openings causes them to act on the same principle as the louvre openings in the hood. The vacuum behind the deflectors, created by the forward motion of the car, sucks the stale air from the interior and at the same time allows fresh air to enter without disagreeable drafts and unpleasant cross currents.

Dole Draft Deflectors add a touch of smartness and refinement. Leading manufacturers have already voiced their approval. The deflectors have the appearance of a permanent built-in part of the car, yet can be installed in five minutes without drilling or marring body finish. They remain in position and are rattle proof. All metal parts chromium plated. Shatter proof safety glass is standard. Good plate glass on request.

Dealers—Put Them on Floor Models

Nine out of ten will be sold with the car—at a handsome profit to you—if necessary, they can be removed without marring car.

THE DOLE VALVE COMPANY

1923 Carroll Ave., Chicago, Illinois

Also manufacturers of Dole Double Compression Couplings, Dole Ball-Roll Couplings, Dole Thermostats, Dole Primers

Dole

DRAFT DEFLECTORS

APRIL TRUCK SALES HOLD TO HIGH LEVEL

(Continued from Page 1)

rast to the records of the other ommercial cars.

Following are the April registra- ons of the leading selling trucks the twenty-eight states and Dis- ict of Columbia, as compared with st year:—

	1930	1929
Ford	13,110	13,619
Chevrolet	7,822	10,065
International	1,526	1,959
Dodge	982	1,790
G. M. C.	727	898
Reo	559	973
Mack	312	484
White	285	383
Rockway-Indiana	198	187
Diamond T	190	237

April sales of commercial cars in several states were higher than in the corresponding month of last year, despite the falling off in the aggregate business for all the states. States to show increases were Maryland, Minnesota, New Hampshire, Oregon, Utah, while Florida and South Dakota missed last year's mark by only one unit in each case.

Following are the April registrations in the reporting states, as compared with last year:—

	1930	1929
Alabama	530	798
Arkansas	431	737
California	2,872	3,039
Connecticut	800	1,039
Delaware	145	176
Florida	392	394
Idaho	230	158
Illinois	2,113	2,720
Maryland	790	762
Michigan	1,968	2,922
Minnesota	1,659	1,113
Missouri	1,773	2,042
Montana	221	525
Nevada	41	87
New Hampshire	381	87
New Jersey	1,584	2,020
North Carolina	612	981
North Dakota	373	648
Ohio	2,611	2,934
Oregon	525	476
Pennsylvania	3,201	3,861
Rhode Island	261	313
South Carolina	330	491
South Dakota	253	254
Utah	271	204
Washington	723	771
West Virginia	586	618
Wisconsin	1,723	2,056
Dist. of Col.	136	196
Totals	27,535	32,807

Registrations of new commercial cars in these twenty-eight states in the first four months of 1930 amounted to 88,765 in the aggregate, as compared with 96,968 in the corresponding period of last year, a decline of 8 per cent.

Following are the registrations for the four months, as compared with the corresponding period of last year, for the individual states:—

	1930	1929
Alabama	2,272	1,573
Arkansas	1,302	2,164
California	8,961	10,441
Connecticut	1,969	2,301
Delaware	449	492
Florida	2,420	1,532
Idaho	590	434
Illinois	9,067	11,017
Maryland	2,315	2,081
Michigan	6,137	8,671
Minnesota	3,519	3,049
Missouri	7,581	6,653
Montana	994	1,635
Nevada	197	346
New Hampshire	688	394
New Jersey	5,619	5,775
North Carolina	2,252	3,375
North Dakota	1,253	1,240
Ohio	7,118	8,435
Oregon	1,391	1,770
Pennsylvania	9,872	10,917
Rhode Island	697	851
South Carolina	1,403	1,577
South Dakota	1,286	1,118
Utah	760	665
Washington	2,395	2,558
West Virginia	1,606	1,500
Wisconsin	4,642	4,404
Totals	88,765	96,968

States among the above showing increases over a year ago are Alabama, Florida, Idaho, Maryland, Minnesota, Missouri, New Hampshire, North Dakota, South Dakota, Utah, West Virginia and Wisconsin.

NEW BUS LINE STARTED

Westwood, N. J., May 28.—With the sanction of the Public Utilities Commission, the Rockland Transit Corporation has begun operation of a bus line between Westwood and Spring Valley, with four buses in service. The route is approximately six miles in length and covers the boroughs of Westwood, Hillsdale, Woodcliffe Lake, Park Ridge, Montvale and Spring Valley, N. Y. The new route is the result of a merger of the Rockland Transit Corporation with the Park Ridge Transportation Company.

Comments, Criticism of Passenger Car Gear Sets

(Continued from page 10)

adds a desirable element of flexibility to the drive.

A further decrease in noise might be realized by mounting the gearset independently of the engine and using cushioning couplings between. This would add some simple parts, but would facilitate access to the clutch and make easy the detaching of the gearset. Fortunately, this operation is not required very often, for in some cars it is necessary to detach and move back the rear axle and gearset to remove and replace clutch facings. Flexible hub clutch discs also help to prevent noise from reaching the gearset.

One source of noise originating within the gearset is constant mesh gearing. The reverse idler sometimes is at fault in this respect. It should not be meshed when not carrying a load, and the same well might apply to other gears. This would not only help to reduce noise but would reduce a considerable power loss involved in churning the gear lubricant. It is very likely that some gear noise might be prevented from reaching the ears of those in the car if some sort of insulating or noise deadening material were added to the gear case and its cover. Body panel drumming has been reduced by a similar expedient.

STANDARD GEARSHIFT SHOULD BE RETAINED

Many years were required for all American makers to adopt the present standard three-speed gearshift positions, and any tendency to depart from this standard is unfortunate. I believe that, if we are to have four-speed undergearsets, the three top speeds should require the same shifting as for the three-speed type, the emergency low-speed being latched out or otherwise arranged to prevent accidental engagement. Any other arrangement is likely to confuse operators in emergencies and lead to many accidents otherwise avoidable.

Questions of type of gear, tooth form and pressure angles probably should be left to gear specialists, but it should not be forgotten that the possibilities on these scores have not been exhausted. Helical gears apparently present possibilities, in the way of decreased noise, that should be investigated. Such gears can be shifted endwise in much the same way as straight spur gears if a small helix angle is used. With such an angle, also, the end thrust is so small that no special provision for taking end thrust is needed and it can be made to nearly cancel out anyway by properly arranging the gears.

Perhaps ultimately we can develop engines having torque characteristics that will make gearsets unnecessary, or satisfactory torque-changing devices that will not require gear changing. Until then it is well to remember that modern gearsets are not incapable of improvement. On the other hand, their chief virtue is their simplicity and low cost. It may pay to sacrifice a part of this virtue for other advantages, but before doing so the engineer should make sure that the gain more than offsets any losses involved.

SUPPLEMENT

Since the foregoing discussion of current gearset designs was prepared, particulars concerning other designs have become available and deserve comment.

The first of these is the Jones four-speed type, having three sets of herringbone gears for the constant mesh, the second, and the overdrive fourth-speed pairs. Although these gears have a full one-inch face, the gearset is the most compact of all the four-speed designs herein discussed. In the drawing reproduced in Fig. 17 an overdrive fourth speed is shown, but virtually the same design can be arranged for direct drive in fourth if desired.

Both primary and secondary shafts are mounted on ball bearings. The constant-mesh gear and second speed pinion are keyed to the secondary shaft, but the fourth-speed gear is loose on this shaft and is engaged by a positive clutch keyed to a sleeve integral with this gear and meshing with an internally toothed sleeve cut integrally with the constant-mesh gear. The positive clutch members for the second-speed gears are formed integrally with the first and second-speed gears on the primary shaft.

In all the positive clutches a coarse pitch and an even number of teeth are employed. Alternate teeth are cut about 3-32 inches short to facilitate engagement at high speed. Shifting is said to be noiseless and very easy at any speed. Quietness in operation is promoted not only by employing herringbone gears, but by using teeth of different pitch in each ratio gearing, the smaller pitches being used in gears that carry the lightest load. The pitch is said to be finer than in the usual conventional gearsets. Quiet operation in the over-geared fourth speed is aided also by pressing the fourth-speed pinion solidly onto the primary shaft and providing an extra long bushing for the gear that meshes with this pinion. The same is true in third speed when the gearset is altered to drive direct in fourth. A very similar gearset, having only three forward speeds, is made by the same company.

Among the simpler designs of gearsets using internal-external gears for one ratio are those being developed by the Morse Chain Company. All four designs are very similar in major characteristics. The design illustrated in Fig. 13 has three speeds and drives direct in third. Another design drives direct in second and has an over-geared third speed. There are also two four-speed designs driving direct, respectively in third and fourth, the first of these being over-geared in fourth speed.

Unlike some of the other designs using internal gears, the constant-mesh set involves only one reduction, being made in the conventional way with a pair of spur gears. In all four cases the secondary gear shaft is fixed, with the gears turning upon it, as in most conventional designs. Only two roller bearings are required for mounting the internal-exterenal set, as against three in some other makes, but in the four-speed over-geared design an extra ball bearing is employed on the primary shaft. Aside from these items and a slightly different arrangement of the internal gears, the design does not differ widely from other designs using internal gears.

TYSON ROLLER BEARING ORDERING NEW MACHINERY

Massillon, O., May 28.—Orders for $155,000 worth of machinery, part of the production equipment of the new Tyson Roller Bearing Company, are now being placed, according to an announcement by C. E. Stuart, president of the corporation. Within the next sixty to ninety days the new corporation expects to have this machinery installed in its plant here and production under way.

DARDELET CORP. GRANTS LICENSE TO BRISTOL CO.

Waterbury, Conn., May 28.—The Bristol Company here, manufacturer of safety hollow set screws and socket head cap screws, has been granted a manufacturing and selling license by the Dardelet Threadlock Corporation under its patents for self-locking screw threads.

LISTS OF FLEET OWNERS

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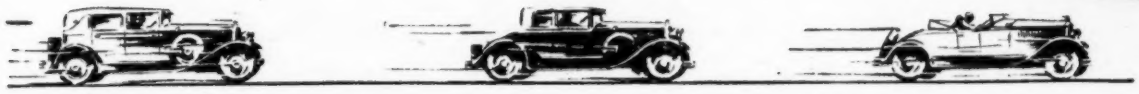

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3. Complete protection to friction surfaces
4. Low gasolene and oil consumption
5. Minimum carbon

Every one of these benefits is present, in maximum amount, in Koolmotor Oil. No one feature is sacrificed to produce a "showy" effect in another. Koolmotor gives this 100% service and protection because it excels in each of the five tests of oil quality—viscosity, fire, flash, pour point, and carbon residue. The good of each test has been retained—5 Point Balance is the result.

You can recommend Koolmotor Oil to your customers with complete confidence and with the assurance it will help the car you've sold them make good every claim you made for it.

CITIES SERVICE OIL COMPANY
60 Wall Street, New York

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